USER MANUAL

ERM-MUX-plus

E1 Multiplexer
Rack Type, 4U

CTC Union Technologies Co., Ltd.

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ERM-MUX/Plus Installation and Operation Manual
E1 Multiplexer, Rack Mount

This manual supports the following models:

ERM-MUX/Plus

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This document is the draft of the to be released manual. Please check CTC Union's website for any updated manual or contact us by E-mail at info@ctcu.com. Please address any comments for improving this manual or to point out omissions or errors to marketing@ctcu.com. Thank you.

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Chapter 1 Introduction

The ERM-MUX/PLUS Time Division-Multiplexer supports four E1 channels that provide the functions of multiplexing and cross-connecting of data/voice/CAS-signaling. The MUX is designed for multiplexing Nx64Kbps, 64K/128Kbps, 9.6Kbps synchronous data, asynchronous data below 38.4Kbps and voice signals into 2.048Mbps ITU-T G.703 E1 frames. The cross-connecting function include the intercrossing of CAS-signaling.

The types and quantity of subscriber's data and voice interface modules can be flexibly selected according to needs. The modules can be plugged into any interface slots according to specific maintenance and application methods. All time slots may be user defined. If more ports are required than are allotted by the main chassis, an extension chassis may be connected later as required.

The ERM-MUX/PLUS supports SNMP and/or NMP GUI network management with local PC or via a dedicated timeslot from the E1 line. The NMP GUI can manage more ERM-MUX/PLUS equipment via the E1 network in-line or in nested structures. A console terminal mode is supported as well. When SNMP management mode is available and selected, remote Telnet and HTTP embedded web server are alsp available for management.

The ERM-MUX/PLUS supports complete redundant functions for the electrical input service, the power module cards, CPU card and E1 card. The E1 backup provides 1+1, 2+2, 1+3 modes. All of these cards are capable of automatic switchover in case of failure. The system has complete warning and diagnostic functions for stable and reliable operation.

Power supply options for 110V AC, 220V AC or -48V DC, ensure maximum flexibility for central office installations. This equipment complies fully with all ITU-T standards for E1 transmissions..

1.1 General Features

Structure
19 or 23 inch rack mountable, 4U standard 18-slot chassis, from left to right:
The 1st and 2nd: POWERA slots.
The 3rd and 4th: POWERB slots.
The 5th :CPUA slot.
The 6th :CPUB slot.
The 7th :E1A slot.
The 8th :E1B slot.
Notice: Each slot has a mark in the front top of the case.
The 9th to 18th slots, defined as I/Oslot 01 ~ I/Oslot 10, may be used for plugging in any of the following user data interface modules. The position, type, and number may be selected as required. Any channel of each module can be multiplexed into any one of the four E1 interfaces, with timeslots configured at user discretion (either in sequence or non-consecutively).

Cable connectors
Front panel
The I/O of each card is accessed from the front panel connectors.
Backplane
Provided with alarm terminals, connects to rack alarm circuits and under failure conditions, alarm signals are sent to shelves/racks.
SNMP Gateway interface provides 100Base-TX unshielded twisted pair interface.
G.703 external clock interface provides two types of interfaces, balanced (RJ-45) and unbalanced (BNC) connectors.
RS-485 interface for cascading multiple racks, provided by RJ-45 x 2 connectors.
DB62 connector for connecting expansion rack.

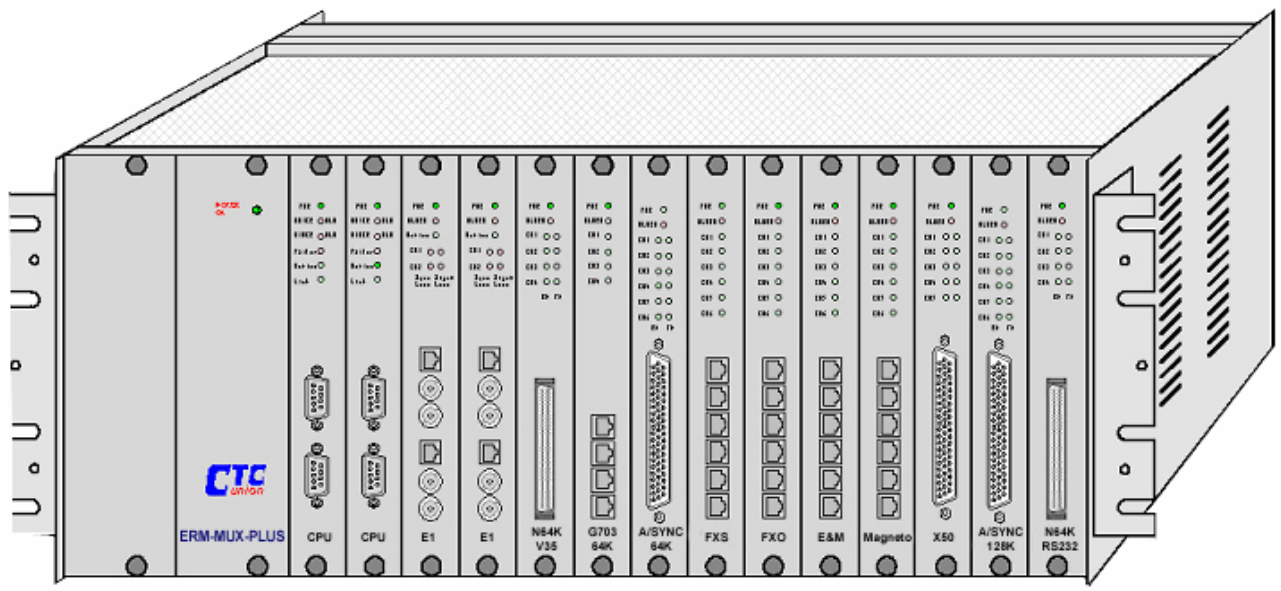


Figure 1.1 ERM-MUX/Plus front panel

1.1.1 Power Supply Modules

POWERA/POWERB slots are used for the power modules. The modules are hot-swappable, capable of automatic switch over in case of module failure, stable, and reliable, with 110VAC, 220VAC or -48VDC options.

1.1.2 CPU Control Card

CPUA/CPUB slots. can insert two CPU modules that automatically work in redundant operation mode. CPU modules are responsible for all parameter setup from local PC or from the selected in-band E1line. The setup of the ERM-MUX/Plus may be accomplished by:
Local PC connected by Ethernet to SNMP (can be extend to multiple cases with RS485 twisted-pair).
Local PC connected by serial NMP port to NMP GUI.
E1 network connected to SNMP/NMP GUI.
Local terminal console mode.

1.1.3 E1 Line Card

E1A/E1B slots. can insert two E1 line modules that automatically work in redundant operation or separately. Each slot can be selected as single E1 module (1xE1) /double E1 module (2xE1). When all E1's are selected as single (1xE1), the 4 E1 channels all support data/voice/CAS signaling cross connection and multiplexing.
Notice : two E1 modules must be configured to single or double E1 mode simultaneously.

1) Combinations:
single module single E1 mode (defined E1A slot)
single module double E1 mode (defined E1A slot)
single module single E1+single module single E1
single module double E1+single module double E1(2+2 redundant or 4xE1 channels)

2) working frame mode
CAS(PCM30) or CCS(PCM31)

3) Backup mode between E1 modules:
The E1 modules may operate in "working" or "backup" mode and are capable of automatic switchover in case of failure (between E1A and the E1B).
Notice: when configured in "backup" mode, the E1 cables can be randomly connected to the E1A or E1B modules on the front panel.

4) Backup modes between E1 lines:
1+1 Backup mode:
E1A1+E1A2
E1B1+E1B2
E1A1+E1B1
E1A2+E1B2

2+2 Backup mode:
E1A1+E1A2 and E1B1+E1B2

1+1/2+2 Line Backup Mode Rules:
a) If the line x breaks down for more than 1 second and the backup line is synchronized, then line x will switch to the backup line. Line x then becomes the backup line and will send UNFRAME ALL ONE's for 10 seconds to force the remote side to switch to the identical mode.
b) After 10 seconds, the backup line will stop sending UNFRAME ALL ONE's.

1+3 Line Backup Mode Rules:
(Both the local and remote sides have selected E1B1 as the backup line.)
a) When one of lines(X) looses synchronization for over 1 second and the E1B1 is already synchronized, the backup for X will switch to E1B1. Line X will then become the backup line and send UNFRAME ALL ONE 10 seconds to force the remote side to switch to the identical mode.
b) When line X recovers, it will switch back to E1A1, E1B1 will become the backup line and send UNFRAME ALL ONE's for 10 seconds to force the remote side to switch to the identical mode.

5) System Clock Mode:
a) E1A1's recovered clock: picked up from the E1A1 receive signal.
b) E1A2's recovered clock: picked up from E1A2 receive signal (E1 module is a double E1).
c) Internal crystal clock.
4) G.703 Ext. clock (when this clock is enabled the internal crystal clock will be used for backup).
e) I/O clock: The timing is locked to the appointed IO Card's CH1 ETXCLOCK. The I/O modules that support this function are: N64K/V35 module, G703-64K module, A/SYNC-128K module, and Sub-E1 module.

6) Time slot 0 pass through function (Sa bit 0-4):

7) E1 circuit diagnostic loop back:

a) Local Loop
b) To Remote Loop
c) Performance and BERT test
When the system CPU firmware upgraded to F/W V3.0 or higher, E1-V2.1 supports the E1 BERT test functions

- System supports performance monitoring and BERT test through SNMP, NMP or Terminal console according RFC 1406 recommendation,
- System supports CRC-4 and BPV monitoring: CURR ES / UAS , LONG ES / UAS
- System supports Loopback test and BERT test: display Rx error amounts, Error counts and Bit-error-rate
- System provides test patterns: 2E9-1, 2E11-1, 2E15-1, QRSS, ALL 0, ALL 1, ALT, 3 IN 24, 1 IN 16, 1 IN 8, 1 IN 4
- System provides Error Insertions: NONE, SINGLE, 10E-1, 10E-2, 10E-3, 10E-4, 10E-5, 10E-6, 10E-7.

1.1.4. N64K/V35 Line Card

Each card contains four Nx64K high-speed data interfaces. N=1 ~ 31 to data rate 64K to 1984Kbps for DCE mode.

1.1.5 A/SYNC-128K Line Card

Each card contains six up to 38.4K data rate for Asynchronous data interfaces, or six 64K/128K sync data interfaces.

1.1.6 G703-64K Line Card

Each card contains four G703-64K co-directional data interfaces.

1.1.7 FXS Line Card

Each card has 6 FXS ports, for connecting directly to phone. And also to establish the connection between phone and FXO card for regular phone or hot-line application.
When system CPU firmware had been upgraded to F/W V3.0 or higher, the FXS-V2.0 or FXO-V2.0 card will provide the E1 link status detection functions and phone line backup functions. It's unnecessary to work with maintainer in the field. The operator can monitor the status of FXS / FXO card and out line status through SNMP management in LEDs status and backup functions. The backup function is set by jumpers inside the FXS / FXO card.
Two modes are provided:
Normal mode: Supports End-to-End of E1 link status monitoring
Backup mode: see Appendix H for further information

1.1.8 FXO Line Card

Each card has 6 FXO ports, for connecting to PBX switchboard. The system manager can create a connection between FXO and FXS card.
When system CPU firmware had been upgraded to F/W V3.0 or higher, the FXS-V2.0 or FXO-V2.0 card will provide the E1 link status detection functions and phone line backup functions. It is unnecessary to work with maintainer in the field. The operator can monitor the status of FXS / FXO card and out line status through SNMP management in LEDs status and backup functions. The backup function is set by jumpers inside the FXS / FXO card
Normal mode: Supports End-to-End of E1 link status monitoring
Backup mode: see Appendix H for further information

1.1.9 E&M Line Card

Each card includes 6 E&M ports (Ear and Mouth), offering either 2-wire or 4-wire voice transmission and E&M signaling with TYPE1-TYPE5.

1.1.10 MAGNETO Line Card

Each card includes 6 magneto phone ports. Each can be connected with another magneto phone set at the remote E1 side.

1.1.11 X.50 Line Card

Each card contains five low-speed Asynchronous/synchronous data interfaces, Data rates: 19.2kBPS,9.6kBPS,4.8BkBPS,2.4kBPS . Standard compliance: RS232/V.24

1.1.12 SUB-E1 Line Card

Each card contains two G.703 E1 interfaces. Each SUB E1 may be multiplexed into any of the E1A1, E1A2, E1B1, or E1B2 interfaces. For special applications requiring the need for Timeslot #0 to be able to transmit the data of CAS signaling, the SUBE1 supports the function of Timeslot #0 By-Pass.

1.1.13 Additional Features

Optional expansion chassis for dense data ports application.
All modules are hot-swappable.
Note: The 9th ~ 18th slots are defined as I/O slots, and described logically as slot 01 ~ slot 10. The upper & back panel of I/O slots have been clearly marked on the rack. Any of the logical slots 1 ~ 10 can random insert N64K/V35,A/SYNC-128K, G703-64K, E&M, FXS, FXO, MAGNETO, Sub E1 or Ethernet Bridge I/O line cards.

1.2 Technical Specifications

1.2.1 E1 Line Line Card

E1 signal structure

- Frame format: CAS(PCM30)/CCS(PCM31), CRC ON/OFF
- Bit rate: 2.048Mbps
- Line codes: HDB3/AMI
- Rx sensitivity: 0 ~ -43dB
- Transmitter driver capability: 1.5km over 0.5mm E1 cable
- Line impedance: 75 ohms (unbalanced) / 120ohms (balanced)
- Pulse amplitude: nominal 2.37V (75ohm) / nominal 3.00V (120ohm)
- Pulse shape: ITU-T G.703 (see figure 1.2)
- Jitter tolerance: ITU-T G.823 compliant, jitter attenuator included
- ITU-T compliance: G.703, G.704, G.732, G.823.
- Internal timing: 2.048Mbps +/- 50ppm.
- Interface connectors: BNC (75ohm unbalanced) / RJ-45 (120ohm balanced).
- System clock
  - Internal: 2.048Mbps +/-50ppm;
  - Recovery: 2.048Mbps +/-50ppm;
  - G.703 External: 2.048Mbps +/-100ppm

1.2.2 N64/V35 Line Card

Multiplexing Nx64K data onto E1 time-slot.

- Data speed:Nx64K(N=1 to 30, or 31).
- Data access:RS-530, RS-449, V.35, X.21, equipped with corresponding interface cable.
- access mode:DCE
- Software setting interface bidirectional loop.

1.2.3 A/SYNC-128K Line Card

- Data speed:≤38.4kbps async or 64kbps/128kbps sync.
- Data access:V.24(RS-232).
- access mode:DCE
- Software setting interface bidirectional loop.

1.2.4 G703-64K Line Card

- Access mode:G.703-64Kbps co-directional mode.
- Speed: 64Kbps+/-100ppm.
- Line: 0.5~0.7mm twisted-pair, 4 Wire.
- Transmitting distance:600m or less (0.5~0.7mm twisted-pair) .
- Impedance: balanced 120ohm.
- Standard: according to ITU-T G.703 and G.823.
- Frame format: unframed.
- Line coding: accord with ITU-T G.703 64K, co-directional coding.
- Pulse Shape: accord with ITU-T G.703, 64K (see figure 1.2).

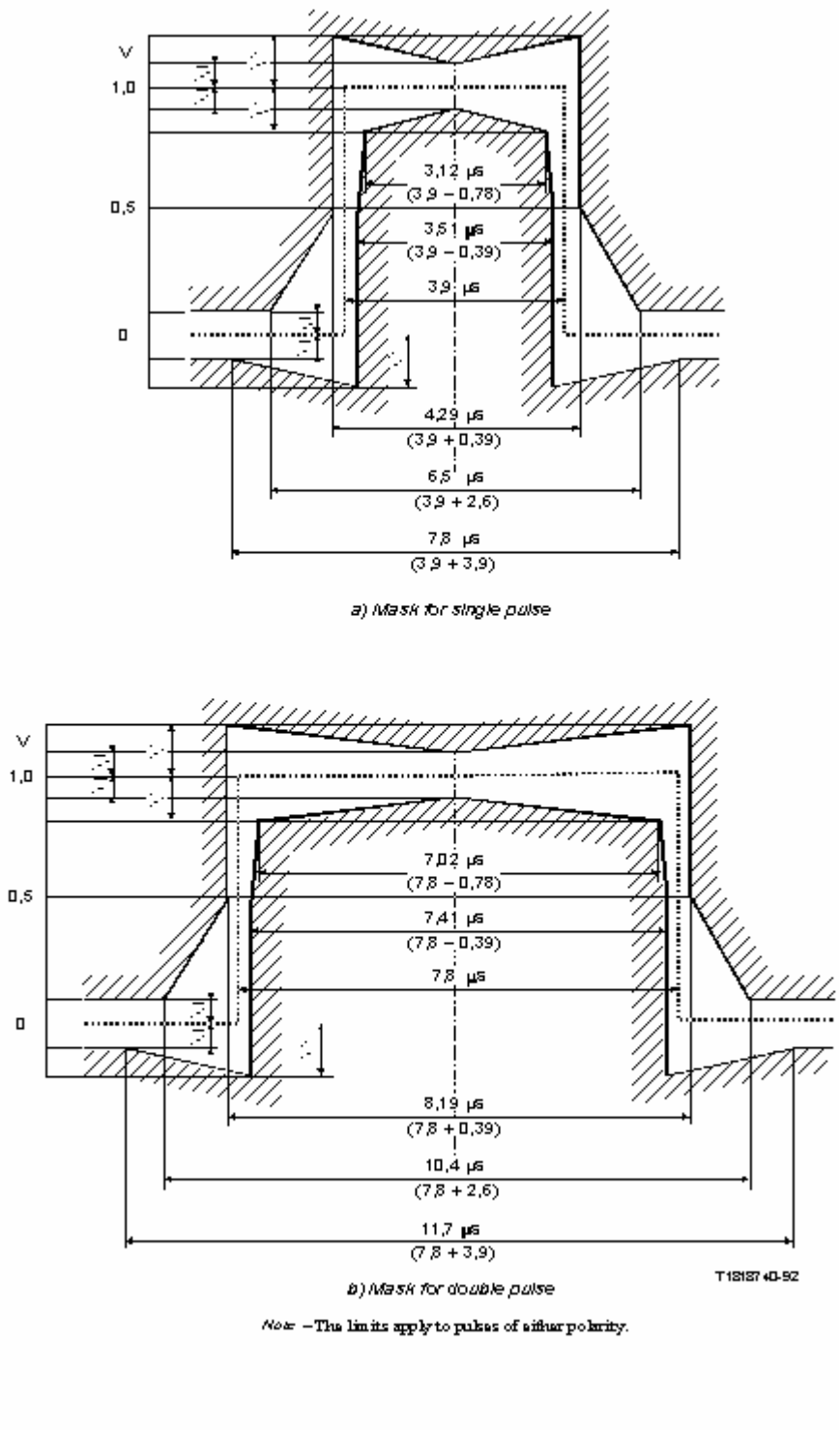


Figure 1-2 :ITU-T G.703 Single pulse & double pulse sample figures

1.2.5 E&M Line Card

E&M Signaling technical specifications

- E&M Signaling used at PBX trunks. Include E line, M line, SB (battery) and SG (ground) lines.
- Loop current:5~30 mA, maximum 70 mA.
- Each port supports 5 types of E&M Signaling; TYPE1-TYPE5 mode independently.
- LEDs at E&M module's front panel indicate the E&M signaling status: active status or idle status.
- Each port can be set up TYPE1-TYPE5 5 types by the switch on board independently.
- (see section 4.3 Voice Transmitting technical index)
- Audio line Impedance: 600 ohm.
- The voice attenuation in each port can be set independently, in 0.5dB steps. For set method refer to section 4.3.
- Each port can be set as 2W/4W by the switch on board independently. see section 4.3.

1.2.6 FXO Line Card

PBX side exterior line (FXO) technical specifications:

- Audio line Impedance: 600 ohm.
- On-hook state resistance large than 100kohm
- Of-hook resistance less than 300ohm
- access endure maximum DC voltage large than 70V
- access endure maximum DC current large than 150mA

1.2.7 FXS Line Card

Telephone exterior line (FXS) technical specifications:

- Audio line Impedance: 600 ohm.
- Ring output virtual value 75+/-15VAC, frequency 25+/-3Hz, partials wave distortion less than 10% sine signal.
- 300mA load output voltage virtual value larger than 50V.
- Feed-in Voltage －48V, allow maximum loop resistance 1800ohm (include inside resistance of phone 300ohm), current of phone large than 18mA
- Off-hook check point is 10+/-3mA.
- Feed-in loop current 18~50mA.
- Long distance access lightning strike wave stream protection characteristic:
- between TIP line RING line and ground line endure 1000V peak voltage, pulse width 10μs, half of peak time
- 700μs to endure voltage without any damage.

1.2.8 MAGNETO Line Card

Telephone exterior line (FXS) technical index:

- Audio line Impedance: 600 ohm.
- Ring output virtual value 75+/-15VAC, frequency 25+/-3Hz, partials wave distortion less than 10% sine signal. 300mA load output voltage virtual value larger than 50V.
- Access endurance maximum DC voltage larger than 70V
- Access endurance maximum DC current larger than 150mA
- Long distance access lightning strike wave stream protect characteristic:
- between TIP line RING line and ground line endure 1000V peak voltage, pulse width 10μs, half of peak time
- 700μs to endure voltage without any damage.

1.2.9 X.50 Module Line Card

Multiplexing low-speed data onto 64Kbps.

- Standard compliance: ITU-T X.50 Division 3, with 6+2 packetization.
- Data rates: Sync / Async ≤19.2K.
- Data interface: V.24 (RS-232)

1.2.10 SUB-E1 Line Card

Specification: same as E1 module

Description: SUB-E1 Line Card supports the function of Timeslot #0 By-Pass; select the function when USER needs to transmit data with Sa4-Sa8 in Timeslot #0.

NOTE: when enabling Timeslot #0 By-Pass

No CRC4 when enabled Timeslot #0 By-Pass

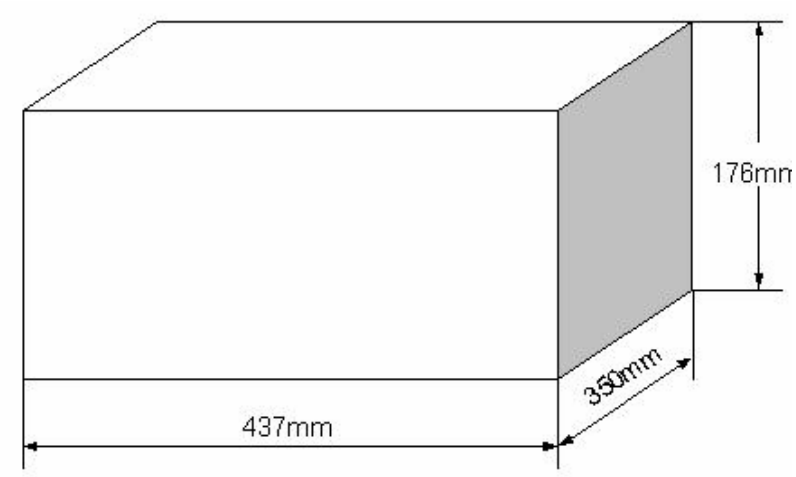
When access equipment selects Timeslot #0 PASS with CAS mode, the corresponding SUB E1 channel should be configured as CCS mode and the Timeslot #16 must be multiplexed onto Timeslot #16 in main link E1. See detailed configuration reference 5.3.9.2.

1.2.11 Power Modules

- Input: 110VAC+/- 15%, 220VAC+/-15%, or -48VDC (-40V to -57V)
- Input power: approximately 60W

1.2.12 Physical Specifications

- Dimensions: Length x Height x Depth = 437mm x 176mm x 350mm
- Weight: 8 Kgs (including dual power & 8 I/IO cards)
- Working environment: Room Temperature: 0C ~ 50C
  Humidity: 90%



Chapter 2 Installation

Fig. 2.1 shows the external view of ERM-MUX/PLUS.

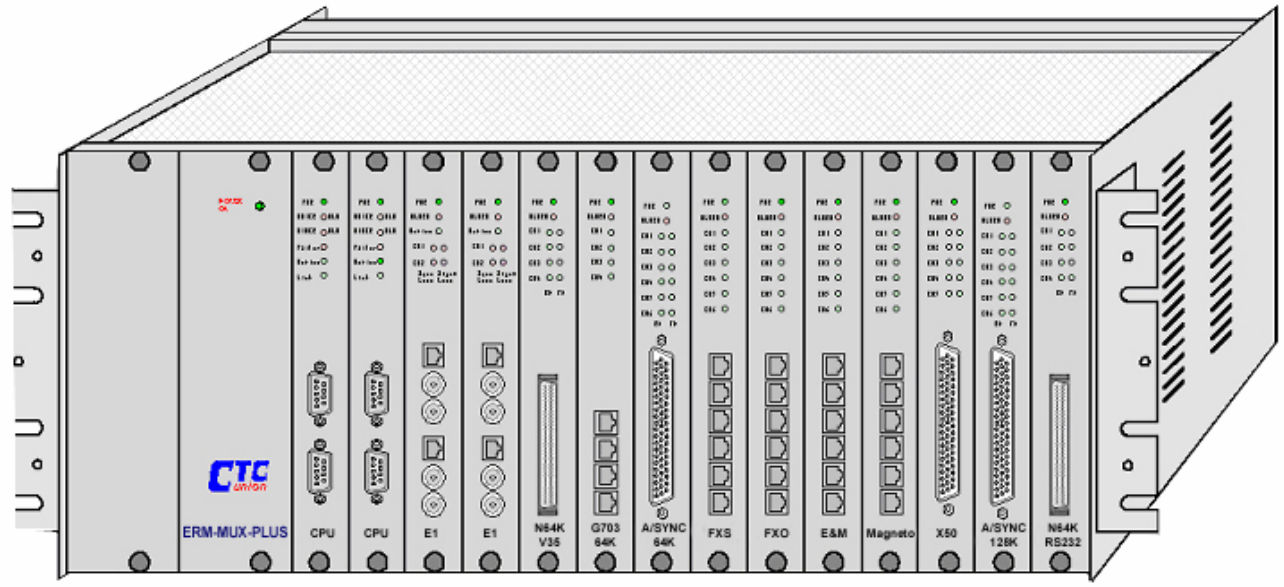


Fig 2.1 ERM-MUX/PLUS appearance

2.1 Installing Brackets on Chassis

By adjusting the position of the brackets on both sides of the chassis, the chassis can be mounted on either 19" or 23" rack or shelf. The supporting bracket could be either on the front or in the middle part of the rack's side, as shown in Fig 2.2.

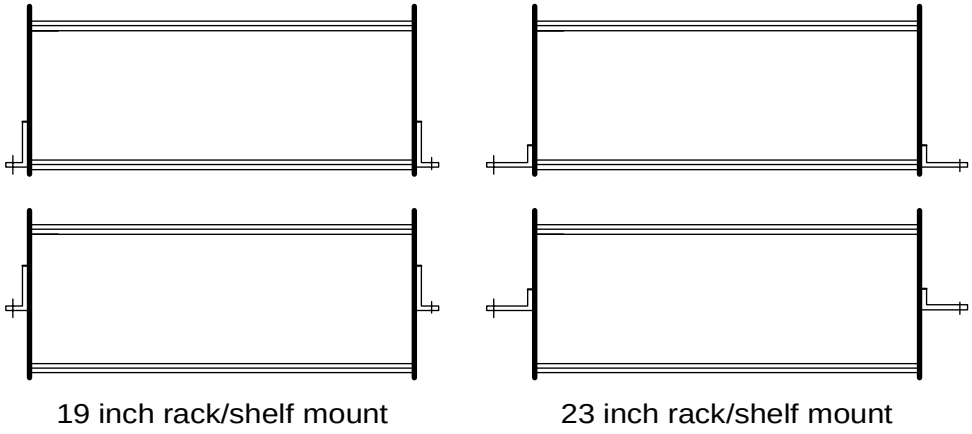


Fig 2.2 Installing supporting brackets (top view)

2.2 Power Modules and Line Card Installation

Power slots POWERA/POWERB are for power modules. Both power modules work in hot standby mode, capable of automatic switchover if one module fails.
* CPU slots CPUA/CPUB are for CPU Cards. Both CPU Cards work with one active and one in hot standby mode, capable of automatic switchover if one card fails.
* E1 slots E1A/E1B are for E1 Line Cards. Both E1 Cards work with one active and one in hot standby mode, capable of automatic switchover if one card fails. (E1 cards may also work in non-redundant mode for 4-E1s)
* IO slot 01 to IO slot 10 may be optionally used for N64K/V35, A/SYNC-128K, G703-64K, E&M, FXS, FXO and Magneto line cards. Their position, type and quantity of line cards may be determined according to customer needs.
Any channel of each module may be multiplexed onto any one of the two or four E1 lines, with timeslots configured at discretion (either in sequence or in random order).
Note: slot positions have been defined by marks on the top of the rack

Cable connectors

Located on Front panel of Line cards
Cables of each card extend from the front panel connectors.

Backplane

Provides the alarm terminals, that connect to rack alarm circuits. Under failure conditions, alarm signals are sent from the shelves/racks.
* SNMP Gateway interface provides a 10/100Base-TX twisted pair Ethernet interface.
* G.703 ext. clock interface provides two types of interfaces, balanced (RJ-45) and unbalanced (BNC) connectors.
* RS-485 interface: for connecting expansion chassis control signals via RJ-45 x 2 connectors.
* HDB 62 interface: for connecting the expansion chassis bus.

2.3 Auxiliary Connections on Rear of Chassis

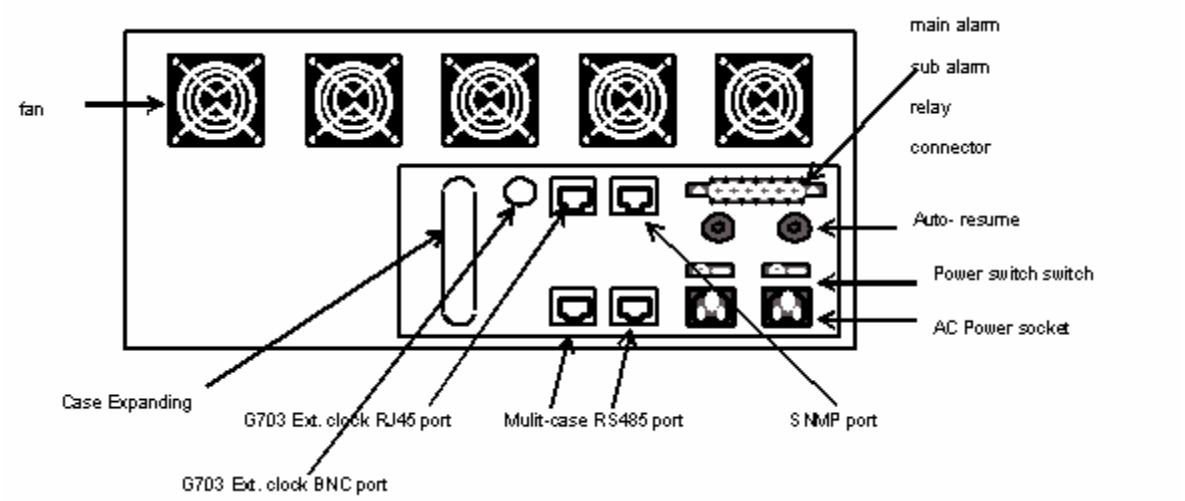


Fig 2.3 ERM-MUX/PLUS Backplane (2 x AC POWER shown)

Connecting Power Supplies

User can select 110VAC, 220VAC or DC power module. AC and DC backplane are different. AC+AC model is shown in fig 2.3.
The connecter of alarm relays, can be connected to the existing alarm system. When the Major Alarm (such as power failure) or Minor Alarm (such as fans failure) occurs, the alarm relays can conduct signal to the whole alarm system.
Alarm Connectors Definition: Major Alarm and Minor Alarm.
Relay Connectors Definition: COM = common, NO = normally open, and NC = normally closed.

Table 2.3 lists the Major Alarm and Minor Alarm content.

Table 2.3 alarm class list

Major Alarm	E1 modules	alarm
		normal
	CPU modules	alarm
		normal
	Power modules	alarm
		normal
Minor Alarm	fan alarm	alarm
		normal
	I/O modules	alarm
		normal
	G703 Ext clock	Ext clock port Signal Loss
		Ext clock port Signal Normal

2.4 Connecting SNMP Network Management Access

SNMP network manage can connect via local or remote PC

Local SNMP network management

Connect RJ-45 cable to HUB/PC from SNMP connecter on backplane

SNMP port provides an auto 10/100Base-TX port with Auto MDIX, using direct connect cable to PC or HUB.

SNMP RJ-45 Pins assignment:Pin 1,2 TD+ TD-, Pin 3,6 RD+ RD-, standard Ethernet.

Using RS-485 connecters (RJ-45x2) can control multiple expansion chassis, see fig 2.4

RS-485's RJ-45 Pins assignment: 4 (+), 5 (-), 7,8 ground.

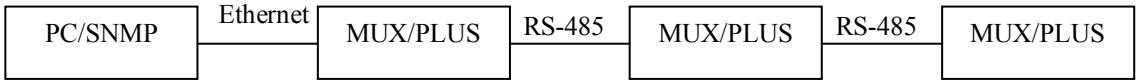


Fig 2.4

2.5 Connecting NMP Network Management Access

NMP network manage can connect via local PC or be cascaded via E1 from other E1 equipment such as ETU-DXC or other ERM-MUX/PLUS. The mode is called In-band network management mode. (See the Network Device Management and Operation User Manual)

Note: Before using NMP/SNMP network functions, configure with console terminal menu to select the network management mode and other necessary settings. (See Chapter 5.)

Local NMP network management

Connect DB9 cable between PC and CPU module front panel NM Ctrl connecter, see fig 2.5.

Communication settings: RS-232/9600bps/N/8/1

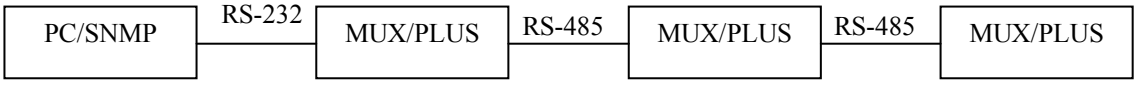


Fig 2.5

Notes:

1) When using double CPU cards and after the power is turned on, the CPU cards will work in Backup Mode automatically, without any need for special setting.

2) The PC to CPU RS-232 cable to front panel should be connected to the Working CPU card.

In-band NMP network management

After setting from the console terminal menu, the E1 from E1A1 line may be cascaded from other superior device (NMP only uses one time slot of an E1 line). Refer to fig 2.6.

Note:Only E1A1 line or its backup E1 line can connect using the in-band NMP network management.

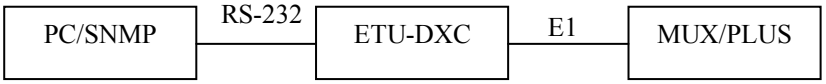


Fig 2.6

2.6 Connecting Monitor/Control Terminal

Connect a DB9 to DB9 cable between the PC COM port and CPU card's front panel LOC Ctrl DB9 connecter.
Communication settings are RS-232/9600bps/8/N/1

2.7 Connecting G.703 External Clock

Unbalance BNC connecter on backplane (EXT CLK)
Balanced RJ-45 connecter on backplane (EXT CLK), Pin assignments: Pin 4,5 Receive, 7,8 Ground.

2.8 Connecting E1 Circuits

Unbalance (75ohm) BNC connecters are provided on the front panel of the E1 card.
Balanced (120ohm) RJ-45 connecters are provided on the front panel of the E1 card; Pin assignment conforms to USOC RJ-48C standard: Pin1,2 Receive, 4,5 Send, 7,8 Ground.
Note:
1) When using E1 Backup mode, the E1 cable can randomly connect to E1A or E1B card on the front panel.
2) When using a single E1,use E1A slot.

2.9 Connecting I/O Cards

For details of all the different IO cards and their connections from front panel with different cables, see chapter 3.
The IO cards all have DCE interface. To emulate DTE you must use crossover cables. For DTE crossed cable connection methods see fig 2.8 fig 2.9 fig 2.10.

2.10 Connecting Sync Tail Circuits

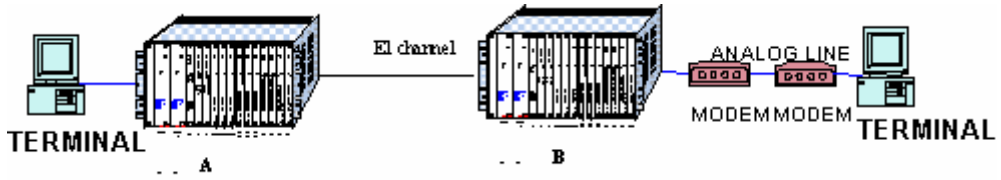


Fig 2.7 Connecting multiplexers with tail circuits

The E1 clock of MUX/PLUS A is configured as master clock, while that of MUX/PLUS B is configured as slave clock.
The Tx clock of MODEM B is configured as loop clock.
MODEM A and MUX/PLUS B (both DCE) are connected with crossover interface cables. All terminal interface cables are straight through cables.

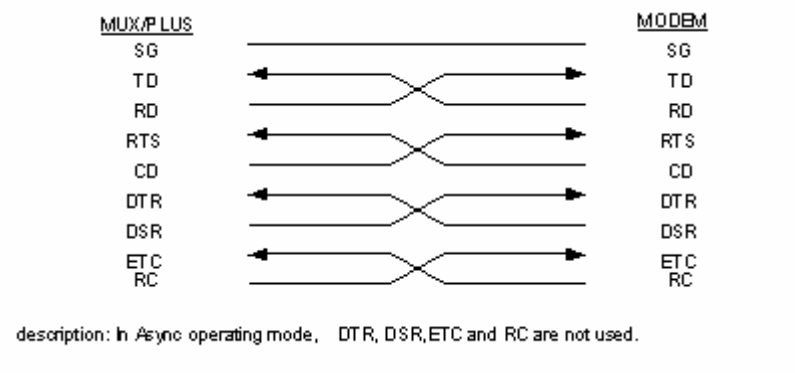


Fig 2.8 RS-232 cross cable

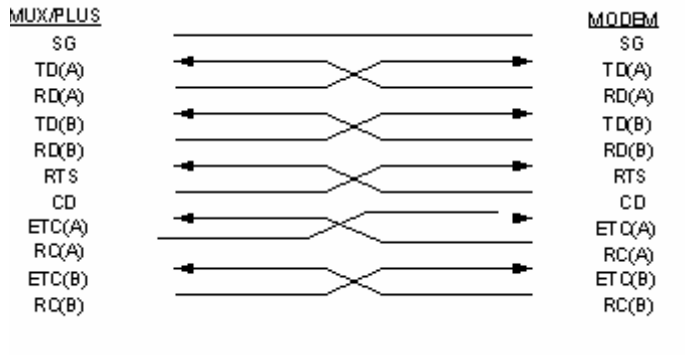


Fig2.9 X.21 cross cable

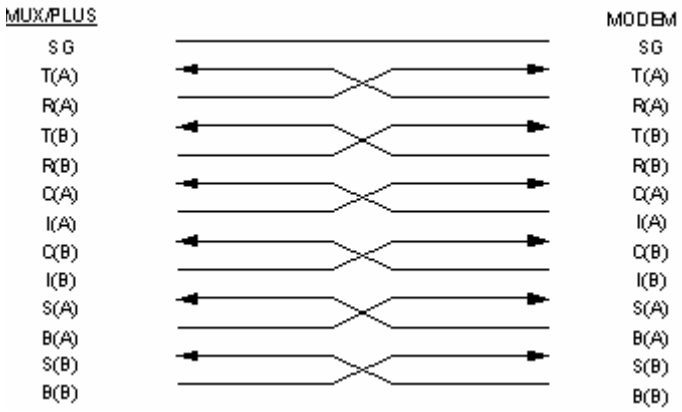


Fig2.10 V.35 cross cable

Chapter 3 LED Indicators and Cable Pin Definitions

3.1 Front panel LED indicators

LED names	Color	Descriptions
POWER Card	green	when lit indicates power is normal, when off - power failure
CPU Card: PWR Major Alarm Minor Alarm Failure Active Link	 green red red red green yellow	 when lit indicates Card power normal, when off - Card power fault when lit indicates major alarm when lit indicates minor alarm when lit indicates configuration failure. when off - normal when lit indicates working. when off -standby when lit indicates SNMP PORT LINK, when off - NO LINK
E1 Card: PWR Alarm Active Ch1 SYNC Signal Loss Loss Ch2 SYNC Signal Loss Loss	 green red green red red red red	 when lit indicates Card power normal, when off - Card power fault when lit indicates Card alarm, when off - normal when lit indicates working, when off -standby when lit indicates SYNC Loss/ Signal Loss, when off - normal when lit indicates SYNC Loss/ Signal Loss, when off - normal
G703-64K Card: PWR Alarm Ch1 Ch2 Ch3 Ch4	 green red red red red red	 when lit indicates Card power normal, when off - Card power fault when lit indicates Card alarm, when off - normal when lit indicates Signal Loss, when off - normal (CH1) when lit indicates Signal Loss, when off - normal (CH2) when lit indicates Signal Loss, when off - normal (CH3) when lit indicates Signal Loss, when off - normal (CH4)
N64K/V35 Card PWR Alarm Ch1 RD TD Ch2 RD TD Ch3 RD TD Ch4 RD TD	 green red green green green green 	 when lit indicates Card power normal, when off - Card power fault when lit indicates Card alarm, when off - normal lit when data is transmitted/ received lit when data is transmitted/ received lit when data is transmitted/ received lit when data is transmitted/ received

LED names	Color	Descriptions
E&M Card PWR Alarm Ch1 Ch2 Ch3 Ch4 Ch5 Ch6	 green red green green green green green green	 when lit indicates Card power normal, when off - power fault when lit indicates Card alarm, when off - normal lit when Signaling is active lit when Signaling is active lit when Signaling is active lit when Signaling is active lit when Signaling is active lit when Signaling is active

FXS Card		
PWR	green	when lit indicates Card power normal, when off - power fault
Alarm	red	when lit indicates Card alarm, when off - normal
Ch1	green	lit when Signaling is active
Ch2	green	lit when Signaling is active
Ch3	green	lit when Signaling is active
Ch4	green	lit when Signaling is active
Ch5	green	lit when Signaling is active
Ch6	green	lit when Signaling is active
FXO Card		
PWR	green	when lit indicates Card power normal, when off - power fault
Alarm	red	when lit indicates Card alarm, when off - normal
Ch1	green	lit when Signaling is active
Ch2	green	lit when Signaling is active
Ch3	green	lit when Signaling is active
Ch4	green	lit when Signaling is active
Ch5	green	lit when Signaling is active
Ch6	green	lit when Signaling is active
MAGNETO Card		
PWR	green	when lit indicates Card power normal, when off - power fault
Alarm	red	when lit indicates Card alarm, when off - normal
Ch1	green	lit when Signaling is active
Ch2	green	lit when Signaling is active
Ch3	green	lit when Signaling is active
Ch4	green	lit when Signaling is active
Ch5	green	lit when Signaling is active
Ch6	green	lit when Signaling is active
X50 Card		
PWR	green	when lit indicates Card power normal, when off - power fault
Alarm	red	when lit indicates Card alarm, when off - normal
Ch1 RD TD	green green	lit when data is transmitted/ received, when off – no data or ch1 disable lit when data is transmitted/ received, when off – no data or ch2 disable
Ch2 RD TD	green green	lit when data is transmitted/ received, when off – no data or ch3 disable lit when data is transmitted/ received, when off – no data or ch4 disable
Ch3 RD TD	green green	lit when data is transmitted/ received, when off – no data or ch5 disable
Ch4 RD TD	green green	
Ch5 RD TD	green green	
SUB-E1 Card		
PWR	Green	when lit indicates Card power normal, when off - Card power fault when lit indicates Card alarm, when off - normal
Alarm	red	when lit indicates SYNC Loss/ Signal Loss, when off - normal
Ch1 SYNC SIGNAL LOSS LOSS	red red	when lit indicates SYNC Loss/ Signal Loss, when off - normal
Ch2 SYNC SIGNAL LOSS LOSS	red red	when lit indicates SYNC Loss/ Signal Loss, when off - normal

3.2 Interface Connector Pins and Definitions

3.2.1 N64K/V.35 Card

ERM-MUX/PLUS N64K/V.35 Cable Pins and Definitions Table (acts as DCE)

HD68-core pins allocations				V.35 Pin	Definition
Channel 1	Channel 2	Channel 3	Channel 4		
Shield	Shield	Shield	Shield	A, Shield	PG
17	18	51	52	B	SG
1	19	35	53	R	RD(A)
2	20	36	54	T	RD(B)
3	21	37	55	V	RC(A)
4	22	38	56	X	RC(B)
5	23	39	57	Y	TC(A)
6	24	40	58	AA	TC(B)
7	25	41	59	P	TD(A)
8	26	42	60	S	TD(B)
9	27	43	61	U	ETC(A)
10	28	44	62	W	ETC(B)
11	29	45	63	D	CTS
12	30	46	64	E	DSR
13	31	47	65	F	DCD
14	32	48	66		
15	33	49	67	C	RTS
16	34	50	68	H	DTR

XX (A) and XX (B) must use the same twisted-pair.

ERM-MUX/PLUS N64K/RS-530 Cable Pins and Definitions Table (acts as DCE)

HD68-core pins allocations				RS-530 DB25 Pin	Definition
Channel 1	Channel 2	Channel 3	Channel 4		
Shield	Shield	Shield	Shield	1,Shield	PG
17	18	51	52	7	SG
1	19	35	53	3	RD(A)
2	20	36	54	16	RD(B)
3	21	37	55	17	RC(A)
4	22	38	56	9	RC(B)
5	23	39	57	15	TC(A)
6	24	40	58	12	TC(B)
7	25	41	59	2	TD(A)
8	26	42	60	14	TD(B)
9	27	43	61	24	ETC(A)
10	28	44	62	11	ETC(B)
11	29	45	63	5	CTS(A)
12	30	46	64	13	CTS(B)
13	31	47	65	8	DCD(A)
14	32	48	66	10	DCD(B)
15	33	49	67	4	RTS(A)
16	34	50	68	19	RTS(B)
				6-20	DSR(A)-DTR(A)
				22-23	DSR(B)-DTR(B)

XX (A) and XX (B) must use the same twisted-pair.

ERM-MUX/PLUS N64K/X.21 Cable Pins and Definitions Table (acts as DCE)

HD68-core pins allocations				X.21 DB15 Pin	Definition
Channel 1	Channel 2	Channel 3	Channel 4		
Shield	Shield	Shield	Shield	1,Shield	PG
17	18	51	52	8	SG
1	19	35	53	4	R(A)
2	20	36	54	11	R(B)
3	21	37	55	6	S(A)
4	22	38	56	13	S(B)
5	23	39	57		
6	24	40	58		
7	25	41	59	2	T(A)
8	26	42	60	9	T(B)
9	27	43	61		
10	28	44	62		
11	29	45	63		
12	30	46	64		
13	31	47	65	5	I(A)
14	32	48	66	12	I(B)
15	33	49	67	3	C(A)
16	34	50	68	10	C(B)

XX (A) and XX (B) must use the same twisted-pair.

ERM-MUX/PLUS N64K/RS-449 Cable Pins and Definitions Table (acts as DCE)

HD68-core pins allocations				RS-449 DB37 Pin	Definition
Channel 1	Channel 2	Channel 3	Channel 4		
Shield	Shield	Shield	Shield	1,Shield	PG
17	18	51	52	19-20-37	SG-RC-SC
1	19	35	53	6	RD(A)
2	20	36	54	24	RD(B)
3	21	37	55	8	RC(A)
4	22	38	56	26	RC(B)
5	23	39	57	5	TC(A)
6	24	40	58	23	TC(B)
7	25	41	59	4	TD(A)
8	26	42	60	22	TD(B)
9	27	43	61	17	ETC(A)
10	28	44	62	35	ETC(B)
11	29	45	63	9	CTS(A)
12	30	46	64	27	CTS(B)
13	31	47	65	13	DCD(A)
14	32	48	66	31	DCD(B)
15	33	49	67	7	RTS(A)
16	34	50	68	25	RTS(B)
				11-12	DSR(A)-DTR(A)
				29-30	DSR(B)-DTR(B)

XX (A) and XX (B) must use the same twisted-pair.

3.2.2 A/SYNC-128K Card

ERM-MUX/PLUS A/SYNC-128K RS232 Pins and Definitions Table (acts as DCE)

HDB62-core pins allocations						RS232 DB25 PIN	Definition
Channel1	Channel2	Channel3	Channel4	Channel5	Channel6		
44	47	50	53	56	59	2	TD
22	5	29	12	36	19	3	RD
1	25	8	32	15	39	4	RTS
3	27	10	34	17	41	5	CTS
24	7	31	14	38	21	6	DSR
43	4	11	35	18	42	7	GND
46	49	52	55	58	61	8	DCD
2	26	9	33	16	40	15	TC
45	48	51	54	57	60	17	RC
23	6	30	13	37	20	24	ETC

3.2.3 G703-64K Card

ERM-MUX/PLUS G703-64K Pins and Definitions Table

RJ-45	Definition
1	RTIP
2	RRING
3	TTIP
4	TRING
7	GND
8	GND

3.2.4 E&M Card

ERM-MUX/PLUS E&M Pins and Definitions Table

RJ-45	Definition
1	4W (send) /2W LINE A
2	4W (send) /2W LINE B
3	4W (receive) /2W LINE A
4	4W (receive) /2W LINE B
5	E-LINE (Signaling)
6	M-LINE (Signaling)
7	SG (Signaling Ground)
8	SB (Signaling Battery)

3.2.5 FXS Card

ERM-MUX/PLUS FXS Pins and Definitions Table

RJ-45 (LINK TO MUX/PLUS)	RJ-11 (LINK TO PHONE LINE)	Definition
4	2	2W-LINE A
5	3	2W-LINE B

3.2.6 FXO Card

ERM-MUX/PLUS FXO Pins and Definitions Table

RJ-45 (LINK TO MUX/PLUS)	RJ-11 (LINK TO PHONE LINE)	Definition
4	2	2W-LINE A
5	3	2W-LINE B

3.2.7 MAGNETO Card

ERM-MUX/PLUS MAGNETO Pins and Definitions Table

RJ-45 (LINK TO MUX/PLUS)	RJ-11 (LINK TO PHONE LINE)	Definition
4	2	2W-LINE A
5	3	2W-LINE B

3.2.8 X50 Card

ERM-MUX-PLUX X50 RS-232 Cable (DCE)

HDB62Pin Male Pin					RS-232 DB25 Female Pin	Function
Channel 1	Channel 2	Channel 3	Channel 4	Channel 5		
Shield	Shield	Shield	Shield	Shield	1,Shield	PG
1	25	29	33	42	7	SG
23	5	51	13	17	3	RD
3	28	11	36	19	17	RC
24	6	31	35	18	15	TC
44	48	10	14	40	2	TD
45	7	12	15	41	24	ETC
4	49	32	56	20	5	CTS
46	8	53	57	61	6	DSR
22	26	30	34	38	8	DCD
2	27	9	55	39	4	RTS

3.2.9 SUB-E1

RJ45	FUNCTION
1	RTIP
2	RRING
3	TTIP
4	TRING
7	PGND
8	PGND

Chapter 4 Hardware Settings

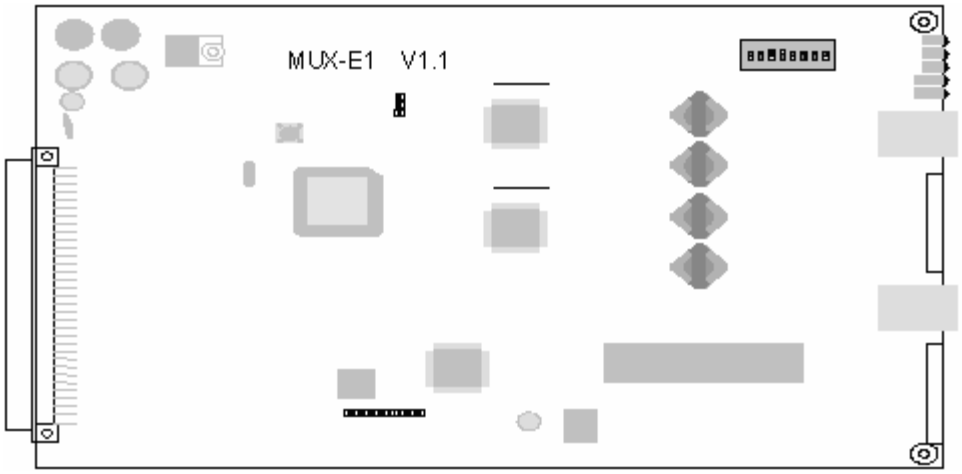
When setting the ERM-MUX/PLUS via NMP/SNMP management system or Terminal console process, the setting parameters are stored in non-volatile RAM. In addition to the soft settings, some PCB cards require some settings of DIP switches or jumpers.

4.1 E1 Card

J10 jumper: When set to "2E1" side the card will show 2 E1 mode (double E1). This is default setting. When connected to "1E1" side, the card operates in single E1 mode. The second E1 channel is disabled.

SW1: All "ON" places E1 card in backup or slave mode.

All "OFF" places E1 card in working or master mode. This is default setting.



4.2 N64K/V35 Card

Interface selection

CH1 Jumper: SW7, SW15, SW3, SW11, SW19

CH2 Jumper: SW5, SW13, SW1, SW9, SW7

CH3 Jumper: SW6, SW14, SW2, SW10, SW18

CH4 Jumper: SW8, SW16, SW4, SW12, SW20

When jumpers set on the RS530 side, the channel works as RS530, X.21, or RS449.

When jumpers set on the V35 side, the channel works as V35.

4.3 E&M Card

4.3.1 Signaling Type Setting

1S1-1S5 is CH1 Signaling selection.
2S1-2S5 is CH2 Signaling selection.
3S1-3S5 is CH3 Signaling selection.
4S1-4S5 is CH4 Signaling selection.
5S1-5S5 is CH5 Signaling selection.
6S1-6S5 is CH6 Signaling selection.

E&M Signaling TYPE 1-5 setting table as follow:
Table 4.1 Signaling mode setting Table

	Jumper position				
Jumpers	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5
S1	C	A	A	B	C
S2	A	B	A	B	A
S3 S4 S5	B	B	B	A	A

Notice: 'C' means no connection

4.3.2 2/4Wire Mode Setting Selection

S6, S7, S8 are CH1 2/4W selection Jumpers.
1S6, 1S7, 1S8 are CH2 2/4W selection Jumpers.
2S6, 2S7, 2S8 are CH3 2/4W selection Jumpers.
3S6, 3S7, 3S8 are CH4 2/4W selection Jumpers.
4S6, 4S7, 4S8 are CH5 2/4W selection Jumpers.
5S6, 5S7, 5S8 are CH6 2/4W selection Jumpers.

Table 4.2 2/4W mode setting Table

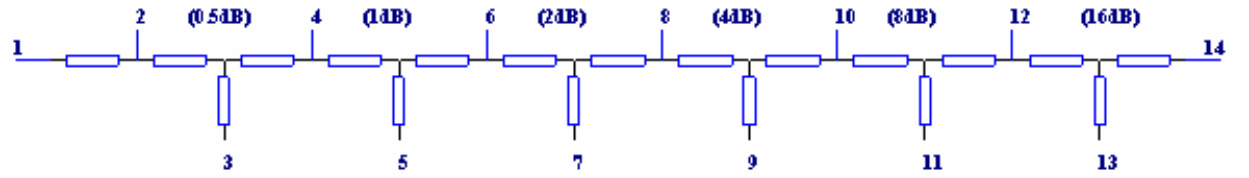
	Jumper position	
Jumpers	Connect to 2 Wire	Connect to 4 Wire
S6	2W mode	4W mode
S7	2W mode	4W mode
S8	2W mode	4W mode

4.3.3 Audio Attenuator Settings

SWA1, 1SWA1, 2SWA1, 3SWA1, 4SWA1, 5SWA1 are the CH1-CH6 TX side (from exterior line input to E&M card) attenuator switch selection.
SWA2, 1SWA2, 2SWA2, 3SWA2, 4SWA2, 5SWA2 are the CH1-CH6 RX side (from E&M card output to exterior line) attenuator switch selection.
Switch setting: see table 4.3

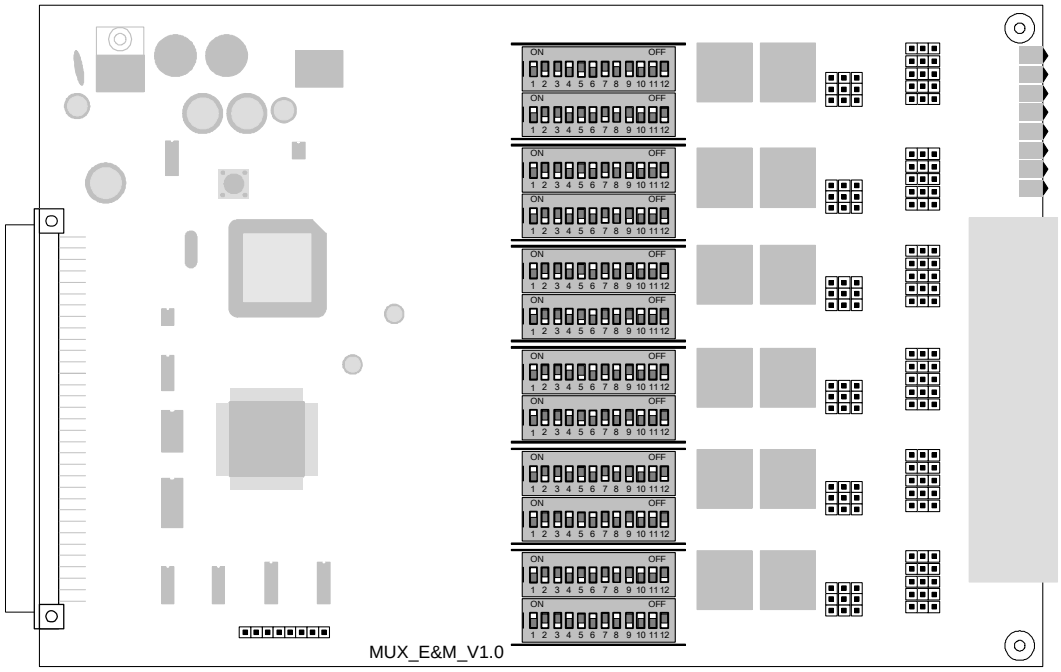
Table 4.3:Audio Attenuator Setting

0.5dB		1dB		2dB		4dB		8dB		16dB	
DISA	ENA	DISA	ENA	DISA	ENA	DISA	ENA	DISA	ENA	DISA	ENA
SW1	SW1	SW3	SW3	SW5	SW5	SW7	SW7	SW9	SW9	SW11	SW11
OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW2	SW2	SW4	SW4	SW6	SW6	SW8	SW8	SW10	SW10	SW12	SW12
ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF



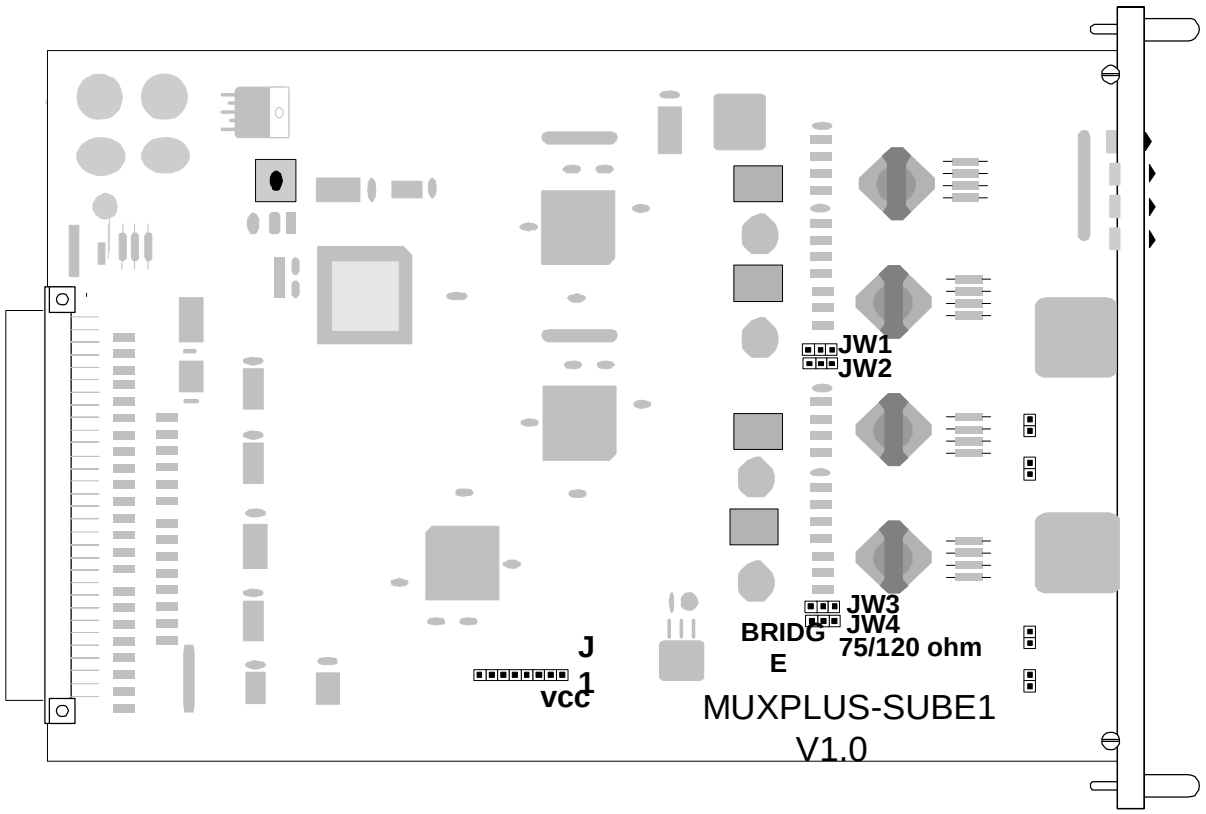
Attenuator internal connection figure

Notice1: The attenuator switch setting is -16dB when set at the factory.
Notice2: If an input level of 0dBm audio signal is received at the TX side, then attenuator in TX side needs to set with -16dB attenuation, otherwise TX side A/D converter voltage level will be saturated.
Notice3: When doing the following settings:
E1 in the local loop.
TX side setting -16dB attenuation.
TX side input 0dBm audio signal.
RX side setting 0dB attenuation.
Then loop gain is about +2.6dB.



4.4 SUB-E1 Card

JW1 and JW2 apply to CH1, JW3, JW4 apply to CH2
BRIDGE: high-impedance; 75/120 Ohm: terminated



Chapter 5 Console Operation

This chapter introduces how to configure the ERM-MUX/PLUS using console terminal mode.

5.1 Initial Setup

Before beginning, please connect ERM-MUX/PLUS to the serial port of a standard terminal or emulation terminal, such as HyperTerminal program on a Windows® PC. The parameter settings for HyperTerminal are: baud rate 9600 bps (bits per second), data bits 8, stop bit 1, no parity check, and no flow control.
Note: When there are two CPU cards, one CPU card will be redundant to the active one automatically after booting the system. Please connect the terminal to the active CPU from the front panel.

5.1.1 Boot

If the system is booted already, initialize configuration. If the system has been set up, load the parameters saved in computer and configure the system. The terminal will display:

```
INIT WAIT ......
SYSTEM PARAMETER SAVE OK!
```

The system will search for each card, and set up with current parameters. If there are no current parameters, omit this step.

```
START CONFIG...................
C/B :CARD SET OK
E1A  2*E1  :CARD SET OK
E1B  2*E1  :CARD SET OK
slot 01  N64K/V35  :CARD NEW ADDED
slot 03  E&M  :CARD SET OK
slot 04  FXO  :CARD SET OK
slot 05  G703-64K  :CARD SET OK
slot 06  FXS  :CARD SET OK
slot 07  MAGNETO  :CARD SET OK
slot 08  A/SYNC-128K  :CARD SET OK

PRESS ESC ENTER MENU
```

Next will display the configuration and status of each card.

```
C/B  E1A1 RECOVER CLOCK,RJ45,STAT, NORMAL
```

The configuration and status of other cards will be see later in this chapter. Press ESC or enter at the menu.

At this point, the console monitors the status of each card and displays the status of configuration changed on the terminal.

```
OPEN MACHINE CONFIG!!
E1 CHANGED!! CONFIG SYSTEM AGAIN!
CONNECT TO NET MANAGER...
EXIT FROM NET MANAGER.
```

5.1.2 Input Password

Under console monitor, operations such as modifying parameters can be done only after inputting password at the prompt.
The system displays:

```
PLEASE INPUT PASSWORD:
```

The password must be six-characters and can contain any letter or number. You can try again if the wrong password is input. The default factory password is '111111' (no quotes). The system will show * for each character input. Press "ESC" key will escape from input. With the correct password keyed in, you may start with menu configuration.

5.1.3 Main Menu

```
<< MAIN MENU >>
1. E1 CONFIG          Browse and modify E1 card parameters
2. I/O CONFIG         Browse and modify I/0 card parameters
3. DISPLAY CONFIG     Display configuration parameters
4. CONFIG             Configure and save
5. SET DEFAULT        Set the device as default
6. SET SYSTEM         Browse and modify system parameters
0. EXIT               Exit menu to monitor mode
INPUT SELECT:
```

Press number key 1 to 5 to enter corresponding menu.
Or press 0 or ESC to return to the monitor mode.

5.2 Set E1 card

Press 1 from the main menu to configure the E1 card. If no E1 card is found, the display shows:

```
NO E1 CARD
```

If the types of two E1 cards are inconsistent, the display shows:

```
E1 CARD TYPE IS NOT SAME
```

If either of the two conditions above exist, user must log out, shut down the system, and reset E1 cards switches.
After E1 cards have been checked, enter the menu configuration.

```
<< E1 CONFIG-MODE >>
1. E1A1               Input E1 channel number
2. E1A2               Input E1 channel number
3. E1B1               Input E1 channel number
4. E1B2               Input E1 channel number
0. EXIT               Input E1 channel number
INPUT SELECT:         Return to the upper menu
```

Press number key 1 to 4 to enter a corresponding sub menu of E1 channel.
Press 0 or ESC to return to the upper menu.

Once selected, the E1 card will be checked, the configuration displayed, and current status of E1 card shown.

```
E1A  DOUBLE E1   STAT ,NORMAL,BACKUP DISABLE,E1A1 RECOVER CLOCK
E1A1:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP TSLOT:31,WORK,LOSS,SYNC,E1
LOSS
E1A2:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP
TSLOT:DISABLE,WORK,LOSS,SYNC,E1 LOSS
E1A1 CROSS TIMESLOT: NULL
E1A2 CROSS TIMESLOT: NULL
```

E1 channel menu display

```
<< E1 CONFIG-E1A1 >>
1. E1 FRAME/TS0 PASS  Set frame mode and timeslot 0 bypass
2. E1 CRC             Set CRC-4 mode
3. E1 LOOP            Set loop back test mode
4. IMPEDANCE          Set E1 impedance
5. CODE               Set E1 line code
6. TIMESLOT CROSS     Set timeslot cross
0. EXIT               Return to the upper menu
INPUT SELECT:
```

Press number key 1 to 6 to enter the corresponding sub menu.
Press 0 or ESC return to the upper menu.

5.2.1 Set Frame Mode

From the E1 channel menu, select 1 to enter frame mode configuration. The menu displays:

```
<< E1 CONFIG-E1A1-FRAME >>

*1. CCS(31 SLOTS)
 2. CAS (30 SLOTS)
 3. CCS TS0 PASS(31 SLOTS)      (CCS+TimeSlot0 Pass)
 4. CAS TS0 PASS(30 SLOTS)      (CAS+ TimeSlot0 Pass)
 0. EXIT                        Return to the upper menu
 INPUT SELECT:
```

('*' indicates the current setting.)

Press number 1 to 4 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new setting.

5.2.2 Set CRC Mode

From the E1 channel menu, select 2 to enter CRC mode configuration. The menu displays:

```
<< E1 CONFIG-E1A1-CRC4 >>

 1.CRC4 ENABLE                  With CRC check
*2.CRC4 DISABLE                 No CRC check
 0.EXIT                         Return to the upper menu
 INPUT SELECT:
```

('*' indicates the current setting.)

Press number 1 to 2 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new setting.

5.2.3 Set Loop Back

From the E1 channel menu, select 3 to enter Loop mode configuration. The menu displays:

```
<< E1 CONFIG-E1A1-LOOPBACK >>
*1.NO LOOP                      No loop
 2.LOCAL LOOP                   Local loop
 3.TO REMOTE LOOP               Turn to remote loop
 0.EXIT                         Return to the upper menu
 INPUT SELECT:
```

('*' indicates the current set.)

Press number 1 to 3 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new setting.

5.2.4 Set Impedance

From the E1 channel menu, select 4 to enter impedance configuration, the menu displays:

```
<< E1 CONFIG-E1A1-IMPEDANCE >>

*1. 75                          75ohm
 2. 120                         120ohm
 0. EXIT                        Return to the upper menu
 INPUT SELECT:
```

('*' indicates the current set.)

Press number 1 or 2 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new setting.

5.2.5 Set Line Code

From the E1 channel menu, select 5 to enter code configuration, the menu displays:

```
<< E1 CONFIG-E1A1-CODE >>
*1.HDB3
 2. AMI
 0. EXIT                          Return to the upper menu
 INPUT SELECT:
```

('*' indicates the current set.)
Press number 1 or 2 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new setting.

5.2.6 Set Timeslot Cross Connect

From the E1 channel menu, select 6 to enter timeslot cross configuration, the menu displays:

```
<< E1 CONFIG-E1A1- TIMESLOT>>

 1. SETUP CROSS                   Time-slot cross set
 2. CANCEL CROSS                  Clear cross time-slot
 0. EXIT                          Return to the upper menu
 INPUT SELECT:
```

Press 2 to clear timeslot cross of the current E1 channel, say E1A1.
Press 1 to display free timeslots of all 4 E1 channels and the current status of timeslot cross. The labels for E1A1, E1A2, E1B1, and E1B2 are 1, 2, 3, 4, respectively.

```
FREE TIMESLOT IS:
E1A1: 0, 11-30,
E1A2: 0, 11-31,
E1B1: 0-31,
E1B2: 0-31,
CURRENT CROSS:
E1A1 CROSS TIMESLOT: 1-10/2:1-10,
```

The current status means the timeslots 1 to 10 of channel E1A1 are going to the timeslots 1 to 10 of channel E1A2.

INPUT EXAMPLE: 11-20/3:11-20, 21/3:21
[1->E1A1,2->E1A2,3->E1B1,4->E1B2]
The example means the timeslots 11 to 20 of channel E1A1 go to the timeslots 11 to 20 of channel E1B1, and timeslot 21 goes from E1A1to E1B1.

```
INPUT TIMESLOT:1-20/2:1-20
```

After inputting timeslot crossing, the results will be displayed.

```
E1A1 CROSS TIMESLOT: 1-20/2:1-20,
```

Press 0 or ESC to return to the upper menu.

5.3 Set I/O card

From the main menu, press 2 to check I/O card. The display shows the slot number for each I/O card:

```
IO CONFIG
SEARCH.....
CARD NO:1,3,4,5,6,7,8,10
INPUT CARD NO:
```

If there are no I/O cards, then no card slot numbers will be displayed.

Input the slot number to enter the corresponding configuration menu for that card. If the selected slot is empty, then the warning message will display:

```
THE NO. CARD IS EXIT
INPUT PLEASE,AGAIN!
INPUT CARD NO:
```

5.3.1 N64K/V35 card configuration

Selecting one N64K/V35 card for configuration. The console will display the current configuration and status information of the N64K/V35 card selected.

```
slot 04 N64K/V35  STATE:NORMAL
```

The display shows the slot number, card type, card status, and status of each channel

```
CH1: E1NO:NULL,DCE,INTERNAL CLOCK,NOLOOP
CH2:E1NO:NULL,DCE,INTERNAL CLOCK,NOLOOP
CH3:E1NO:NULL,DCE,INTERNAL CLOCK,NOLOOP
CH4:E1NO:NULL,DCE,INTERNAL CLOCK,NOLOOP
```

The status of each channel, including multiplexed E1 channel, timeslot, clock mode, loop mode are displayed.

5.3.1.1 N64K/V35 menu display

```
<< I/O CONFIG-N64K/V35 >>
 1. CH1                    Set channel 1
 2. CH2                    Set channel 2
 3. CH3                    Set channel 3
 4. CH4                    Set channel 4
 0. EXIT                   Return to the I/O card configuration
INPUT SELECT:1
```

Press 0 or ESC to return to the I/O card selection menu. Press 1-4 to enter SYNC channel configuration. (The same configuration menus apply for channels 1 to 4).

5.3.1.2 N64K/V35 channel menu display

Select a channel, for example channel 1, and enter configuration menu. The menu displays the following:

```
<< IO CONFIG-N64K/V35-CHANNEL 1 >>
1.CONNECT E1              Set multiplex E1 channel
2.CONNECT TIMESLOT        Set multiplex timeslot(s)
3.LOOP                    Set loop
4.CLOCK                   Set clock mode
0.EXIT                    Return to the upper menu
INPUT SELECT:
```

Press 0 or ESC return to the upper menu. Press 1-4 to enter the corresponding configuration item.

5.3.1.3 Set multiplex E1 number

Press 1 to enter the configuration menu of setting E1 channel. The menu displays:

```
<< IO CONFIG-N64K/V35-CHANNEL 1-E1 >>
*1. DISABLE                    No multiplexing
 2. E1A1                       Multiplexing from E1A1
 3. E1A2                       Multiplexing from E1A2
 4. E1B1                       Multiplexing from E1B1
 5. E1B2                       Multiplexing from E1B2
 0. EXIT                       Return to the upper menu
INPUT SELECT:
```

('*'indicates the current setting.)
Press number 1 to 5 to configure and press 0 or ESC return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new configuration setting.

5.3.1.4 Set multiplex timeslot

Press 2 to configure the multiplex timeslot. If an E1 channel has not been assigned yet, the system displays:
PLEASE CHOOSE CONNECT E1 FIRST!
If an E1 channel connection has already been set, for example E1A1, then the system displays the available idle timeslots for the E1 channel assigned.

```
FREE TIMESLOT :
E1A1: 01-30,
E1A2: 01-31,
E1B1: 01-31,
E1B2: 01-31,
```

The display also shows any current status if there are any timeslots connection from any E1.

```
CURRENT:E1A1-NULL
```

INPUT EXAMPLE: 3-9,11

```
INPUT TIMESLOT: 3-9,11
```

One or more idle timeslots can be assigned to one N64 I/O channel:
You can assign one single timeslot number or consecutive timeslot numbers. For example, "5,10-20,27" means the timeslots 5, 10 to 20, and 27 of E1A1 (selected earlier) are assigned to CH1 of I/O card.
Input the idle timeslot number(s) and press Enter to confirm. Return to the upper menu. If the input timeslot has already been assigned previously, the system will prompt:

```
THE TIMESLOT ALREADY USED!
INPUT AGAIN!
INPUT TIMESLOT:
```

If no timeslot number has been input, then press Enter or ESC to return to the upper menu.

5.3.1.5 Set loop mode

Press 3 to set loop mode of I/O channel. The menu displays

```
<< IO CONFIG-N64K/V35-CHANNEL 1-LOOPBACK >>
*1. LOOP                       With loop
 2. NORMAL                     Without loop
 0. EXIT                       Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)
Press 1 or 2 to select the loop back configuration. Press 0 or ESC to return to the upper menu. After key 1 or 2 is pressed, the menu will be shown again, and '*' will indicate the new setting.

5.3.1.6 Set clock mode

Press 4 to set the clock mode of the I/O channel. The menu displays

```
<< IO CONFIG-N64K/V35-CHANNEL 1-CLOCK >>
*1. INTERNAL                    Set internal clock
 2. EXTERNAL                    Set external clock
 0. EXIT                        Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)
Press 1 or 2 to select the clock mode configuration. Press 0 or ESC to return to the upper menu. After keying 1 or 2, the menu will be shown again, and '*' will indicate the new setting.

5.3.2 Set G703-64K Card

When entering the G703-64K card configuration under the I/O card sub-menu, the display will show the current configuration and status information of the G703-64K card selected.

```
slot 03 G703-64K STATE:NORMAL
Slot number card type card status
CH1:NOE1:NULL,INTERNAL CLOCK,NOLOOP
CH2:NOE1:NULL,INTERNAL CLOCK,NOLOOP
CH3:NOE1:NULL,INTERNAL CLOCK,NOLOOP
CH4:NOE1:NULL,INTERNAL CLOCK,NOLOOP
```

The display shows the status of each channel, including multiplexed E1 channel, timeslot, clock mode, loop mode.

5.3.2.1 G703-64K menu display

```
<< I/O CONFIG-G703 >>
 1. CH1                         Set channel 1
 2. CH2                         Set channel 2
 3. CH3                         Set channel 3
 4. CH4                         Set channel 4
 0. EXIT                        Return to the input box of I/O configuration
INPUT SELECT:1
```

Press 0 or ESC to return to the main menu of I/O configuration.
Press 1 to 4, to enter the channel configuration for the G703-64K channel. The procedure is the same for each channel, 1-4. The basic settings are similar to those of the N64K/V35, however, each channel can be assigned with only one timeslot (64kbps).

5.3.3 Set A/SYNC-128K Card

Please refer to N64K/V35 configuration, for examples of how to configure A/SYNC-128K cards. The only differences are that there are 6 channels in one A/SYNC-128K card (4 in N64K/V35 card) and up to 2 timeslots can be assigned to one channel in one A/SYNC-128K card.
Note: When assigning two timeslots, the system can have asynchronous transfer rate of 38.4k baud. If only single timeslot is assigned, the recommended maximum asynchronous rate is 19.2k baud.

5.3.4 Set FXS card

When entering the FXS card configuration under the I/O card sub-menu, the system checks and displays the current configuration and status information of the FXS card selected.

```
slot 05 FXS     STATE:NORMAL
CH1:NOE1:NULL,NORMAL
CH2:NOE1:NULL,NORMAL
CH3:NOE1:NULL,NORMAL
CH4:NOE1:NULL,NORMAL
CH5:NOE1:NULL,NORMAL
CH6:NOE1:NULL,NORMAL
```

5.3.4.1 FXS menu display

```
<< I/O CONFIG-FXS >>
 1. CH1                          Set channel 1
 2. CH2                          Set channel 2
 3. CH3                          Set channel 3
 4. CH4                          Set channel 4
 5. CH5                          Set channel 5
 6. CH6                          Set channel 6
 0. EXIT                         Return to the main menu of I/O card configuration
INPUT SELECT:
```

Press 0 or ESC to return to the I/O card sub-menu.
Press 1 to 6 to enter the FXS channel configuration. The setting procedure is the same for each channel, 1-6.

5.3.4.2 Channel menu display

When selecting one FXS channel, for example CH1, the menu displays:

```
<< IO CONFIG-FXS-CHANNEL 1 >>
1. CONNECT E1                    Set multiplex E1 channel
2. CONNECT TIMESLOT              Set multiplex timeslot
3. WORK MODE                     Set work mode
0. EXIT                          Return to the upper menu
INPUT SELECT:
```

Press 0 or ESC return to the upper menu. Press 1 or 2 to enter the corresponding configuration sub-menu. The subsequent procedure is the same as N64K/V35 configuration. However, only one timeslot can be assigned to one channel.
Press 3 to enter the configuration of work mode.

5.3.4.3 Set Work mode

Press 4 to set work mode of the FXS channel. The menu will display:

```
<< IO CONFIG-FXS-CHANNEL 1-WORK >>
*1. NORMAL
 2. HOTLINE                      Set hot line (off-hook will ring remote side)
 0. EXIT                         Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press number 1 to 2 to configure and press 0 or ESC to return to the upper menu. After selection, the menu will refresh, and '*' will indicate the new setting.

5.3.5 Set FXO Card

Please refer to FXS configuration menu. The settings for FXO are the same, with the exception that there is no work mode setting for the FXO cards. (Only FXS supports the 'hot line' function.)

5.3.6 Set E&M Card

Please refer to FXS configuration menu. The settings for E&M are the same, with the exception that there is no work mode setting for the E&M cards. (Only FXS supports the 'hot line' function.)

5.3.7 Set Magneto Card

Please refer to FXS configuration menu. The settings for Magneto card are the same, with the exception that there is no work mode setting for the Magneto cards. (Only FXS supports the 'hot line' function.)

5.3.8 Set X.50 Card

Input X.50 module number from the main I/O module menu. The system will check and display the current configuration and status.

```
SLOT 4       X50       STATE:NORMAL
Slot number  module type   module status
NOE1:                      NULL,             NOLOOP,      SBIT 1
Multiplexing E1 Number:  Multiplexing Slot Number,  Loop,      SBIT
CH1:            9600,   ASYNC,   INTERNAL CLOCK,  10 BIT,   NOLOOP
Channel Number:  Rate  Sync / Async,  Clock Mode,       Data BIT  Loop
CH2:9600,ASYNC,INTERNAL CLOCK,10 BIT,NOLOOP
CH3:9600,ASYNC,INTERNAL CLOCK,10 BIT,NOLOOP
CH4:9600,ASYNC,INTERNAL CLOCK,10 BIT,NOLOOP
CH5:9600,ASYNC,INTERNAL CLOCK,10 BIT,NOLOOP
```

5.3.8.1 X.50 Menu Display

```
<< I/O CONFIG-X.50 >>
```

1. CH1	Set Channel 1
2. CH2	Set Channel 2
3. CH3	Set Channel 3
4. CH4	Set Channel 4
5. CH5	Set Channel 5
6. CONNECT E1	Set Multiplex Onto E1 Number
7. CONNECT TIMESLOT	Set Multiplexed Timeslot Number
8. LOOP	Loop
9. SBIT	SBIT Mode
0. EXIT	Return to main I/O Module menu

```
INPUT SELECT:1
```

Press 0 or ESC key to return to main I/O Module menu. Press 1 to5 to set the X.50 Channel (the same configuration procedure applies to all channels, CH1 to CH5) The X50 card only requires one timeslot for all 5 channels.

5.3.8.2 Channel Menu Display

X.50 Menu Status, select channel, set channel, menu display:

```
<< IO CONFIG-X50-CHANNEL 1 >>
```

1. SPEED	Set rate
2. SYNC/ASYNC	Set Sync / Async
3. CLOCK	Clock Mode
4. DATA BIT	Data BIT
5. LOOP	Loop
0. EXIT	Return to top menu

```
INPUT SELECT:
```

Press 0 or ESC key to return to top menu. Press 1 to 5 to enter configuration parameter.

5.3.8.2.1 Set Rate

Press 1 key to set rate. The menu will display:

```
<< IO CONFIG-X50-CHANNEL 1-SPEED >>
 1. 2400 BPS                    2400BPS
 2. 4800 BPS                    4800 BPS
*3. 9600 BPS                    9600 BPS
 4. 19200 BPS                   19200 BPS
 0. EXIT                        Return to top menu
INPUT SELECT:0
```

('*'indicates present value.)
NOTE:In order to use the 19.2k bps setting, two channels must be sacrificed. Only CH1/CH3 support 19200 BPS and then CH2/CH4/Ch5 cannot be used. For any rate under 19200, all five channels may be used.
Press 1 to 4 to select the rate value. Press 0, ENTER or ESC key to return to the upper menu. After selection, the menu will refresh, and '*' will indicate the new setting.

5.3.8.2.2 Set Sync / Async

Press 2 key to Set Sync / Async. The menu will display:

```
<< IO CONFIG-X50-CHANNEL 1-ASYNC >>
*1. ASYNC                       ASYNC
 2. SYNC                        SYNC
 0. EXIT                        Return to top menu
INPUT SELECT:0
```

('*'indicates present setting.)
Press 1 or 2 to select value. Press 0, ENTER or ESC key to return to the upper menu. After selection, the menu will refresh, and '*' will indicate the new setting.

5.3.8.2.3 Set Clock Mode

Press 3 key to Set Clock Mode. The configuration process is the same as that of N64K/V35 card clock configuration.

5.3.8.2.4 Set Data BIT

Press 4 key to Set Data BIT. The menu will display:

```
<< IO CONFIG-X50-CHANNEL 1-DATA BIT >>
 1. 8 BIT                       8 Data Bits
 2. 9 BIT                       9 Data Bits
*3. 10 BIT                      10 Data Bits
 4. 11 BIT                      11 Data Bits
 0. EXIT                        Return to top menu
INPUT SELECT:0
```

('*'indicates present value.)

Press 1 to 4 to select configuration. Press 0, ENTER or ESC key to return to the upper menu. After selection, the menu will refresh, and '*' will indicate the new setting.
Note: For synchronous setting, select 8 data bits. For asynchronous settings, select according to the required number of bits. For example, 8 bit, 1 stop, no parity will require 10 bits (1 start bit+8 data bits+1 stop bit).

5.3.8.2.5 Set Loop

Press the 5 key from the channel set menu to setup data channel loop back. The configuration steps are the same as those of the N64K/V35 card loop configuration.

5.3.8.3 Set Multiplexing Onto E1 Number

Return to the X.50 set main menu. Press 6 key to Set Multiplexing Onto E1 Number. The configuration steps are the same as those of the N64K/V35 card loop configuration.

5.3.8.4 Set Multiplexed Timeslot Number

Return to X.50 set main menu, Press 7 key to Set Multiplexed E1 Timeslot Number. The configuration steps are the same as those of the N64K/V35 card loop configuration. X.50 card only requires one timeslot for all 5 data channels.

5.3.8.5 Set Loop

Return to X.50 set main I/O menu. Press 8 key to Set Loop for the entire assigned timeslot. The configuration steps are the same as those of the N64K/V35 card loop configuration.

5.3.8.6 Set SBIT

Return to X.50 set main menu, press 9 key to set SBIT. The menu will display:

```
<< I/O CONFIG-X50-S BIT >>
 1. S=0                          S BIT value :0
*2. S=1                          S BIT value: 1
 0. EXIT                         Return to top menu
INPUT SELECT:0
```

('*'indicates current setting.)
Press 1 to 2 to select configuration. Press 0, ENTER or ESC key to return to the upper menu. After selection, the menu will refresh, and '*' will indicate the new setting.

5.3.9 Setup SUB-E1 Card

Input the SUB-E1 card number on main I/O setting menu. The system will check the card and display the current configuration and status.

```
slot 7      SUBE1       STAT: NORMAL
Slot number  module type    module status
CH1:        NOE1:      NULL,      CCS,    CRC4 DISABLE,   NOLOOP,
Channel No  Multi E1 No  Multi TS No  Framed       CRC4        Loop
Code       Impedance
HDB3      BNC MODE
LINE STAT:SIGNAL NORMAL,LOCAL SYNC ,REMOTE SYNC ,AIS NORMAL
CH2:NOE1:NULL,CCS,CRC4 DISABLE,NOLOOP,HDB3,BNC MODE
LINE STAT:SIGNAL NORMAL,LOCAL SYNC ,REMOTE SYNC ,AIS NORMAL
```

5.3.9.1 SUB-E1 Menu Display:

```
<< I/O SET-SUBE1 >>
 1. CH1                          Set CH1
 2. CH2                          Set CH 2
 0. EXIT                         Return to entrance of inputting I/O Module Number
INPUT SELECT:
```

Press 0 or ESC key to return to the main I/O menu. Press 1 or 2 to set the appropriate SUB-E1 Channel. The configuration settings are the same for channel 1 and channel 2.

5.3.9.2 Channel Menu Display:

```
<< IO CONFIG-SUBE1-CHANNEL 1 >>
 1. CONNECT E1                   Set link E1 No.
 2. CONNECT TIMESLOT             Set TS No.
 3. E1 FRAME/TS0 PASS            Set Framed And TS0 By-Pass
 4. E1 CRC                       Set SUBE1 CRC
 5. E1 LOOP                      Set SUBE1 Loop
 6. IMPEDANCE                    Set SUBE1 Impedance
 0. EXIT                         Return to top menu
INPUT SELECT:
```

Press 1-2 key to assign the link E1 number and Timeslot number. Press 3-6 key to Set SUB-E1 parameters. The remaining configuration processes are the same as for the main E1.
Press 0 or ESC key to return to the upper menu.

Description of Timeslot #0 By-Pass:
No CRC4 can be assigned when the E1 setting is Timeslot #0 By-Pass.
When access equipment selects Timeslot #0 By-Pass with CAS mode, corresponding SUB-E1 must be configured to CCS mode and the Sub-E1's Timeslot #16 should be multiplex onto Timeslot #16 in main link E1.

SUB-E1 Card normal setting follows:
Enter I/O SET-SUBE1 menu.
Select 2:set CONNECT TIMESLOT and TIMESLOT 16
Select 3:set E1 FRAME CCS, NO CRC4 and enable TS0 By-Pass.
Set corresponding main link E1 CCS, NO CRC4 and enable TS0 By-Pass.

5.4 Display devices configuration

Press 3 from the main menu. The system displays the configuration and status of each module, including CPU, E1, and I/O cards.

```
<< DISPLAY CONFIG >>
 1. DISPLAY CARD DETAIL        Display card configuration
 2. DISPLAY WORK STATE         Display device and working status of card
 0. EXIT                       Return to the main menu
INPUT SELECT:1
```

Pressing 1 will show the following status:
Presence of cards
Working status
Configuration parameters
Note: The system will not refresh itself when in "3.DISPLAY CONFIG", only in the main menu 2, 4, & 5.

Press 2 to display the working status of each plug-in module, including CPU, power, fan, E1, and I/O cards. The system will refresh in real time. It will also display the status of G.703 external-clock device, if any is present.
Press 0 or ESC to return to the main menu.
After pressing 1, the system will display statuses in order for CPU card, E1 card and I/O cards. The following is a configuration example.

```
BACKUP CPU OFFLINE

C/B  E1A1 RECOVER CLOCK,BNC,STAT ALARM

E1A  2*E1     STAT: ALARM,BACKUP DISABLE,E1A1 RECOVER CLOCK
E1A1:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP:31,BACKUP STAT:WORK
     LOCAL LOSS,REMOTE LOSS,E1 LOSS
E1A2:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP:DISABLE,BACKUP STAT:WORK
     LOCAL LOSS,REMOTE LOSS,E1 LOSS
E1A1 CROSS TIMESLOT: NULL
E1A2 CROSS TIMESLOT: NULL

E1B  2*E1     STAT: ALARM,BACKUP DISABLE,E1A1 RECOVER CLOCK
E1B1:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP:DISABLE,BACKUP STAT:WORK
     LOCAL LOSS,REMOTE LOSS,E1 LOSS
E1B2:CCS,NO CRC4,NOLOOP,HDB3,75,-20dB,128 BYTES,NMP:DISABLE,BACKUP STAT:WORK
     LOCAL LOSS,REMOTE LOSS,E1 LOSS
E1B1 CROSS TIMESLOT: NULL
E1B2 CROSS TIMESLOT: NULL

slot 07  MAGNETO      STATE:NORMAL
CH1:NOE1:NULL
CH2:NOE1:NULL
CH3:NOE1:NULL
CH4:NOE1:NULL
```

```
CH5:NOE1:NULL
CH6:NOE1:NULL
```

After pressing 2, system will display the current working status of each component in the order of active-CPU, backup-CPU, fan, power, external clock, C/B, E1, and I/O. The example is as below:

```
WORK CPU: CPU-B
BACKUP CPU: CPU-A   OFFLINE
FAN:01-ALARM,02-ALARM,03-ALARM,04-ALARM,05-ALARM
POWER AB ALARM
EXT-CLK ALARM

C/B  NORMAL
E1A  2*E1  NORMAL
E1B  2*E1  NORMAL
slot 01  FXS  NORMAL
slot 03  FXS  NORMAL
slot 04  N64K/V35  NORMAL
slot 06  E&M  NORMAL
slot 07  MAGNETO  NORMAL
```

5.5 Save Configuration

All previously outlined modified configurations are saved temporarily in volatile ram. If the chassis is powered off or the CPU card removed, the settings will revert back to the previous ones. Following the settings done previously, the changes must be written to non-volatile ram. From the main menu, item 4 CONFIG, is the utility to save all the configuration settings. It is also highly recommended to do save settings following all major configuration sections. For example, save after doing system configuration, save again after setting E1 parameters, and finally save after setting each I/O card. Configuration modified is saved temporarily only.

After pressing 4 in the main menu, the system asks:

```
SYSTEM WILL BE CONFIGURED, ARE YOU SURE(Y/N)?
```

Press N or n to escape.
Press Y or y to start saving the configuration.

```
SYSTEM PARAMETERS SAVE OK!
START CONFIG.............................
```

The system will now check all the new settings for each card and display the results of save configuration, success or failure.

```
C/B  :CARD SET OK                    parameters set OK
E1A  2*E1  :CARD SET OK              parameters set OK
E1B  2*E1  :CARD SET OK              parameters set OK
slot 01  N64K/V35  :CARD SET OK      parameters set OK
slot 03  E&M  :CARD SET ERROR        parameters set error
slot 04  FXO  :CARD SET OK           parameters set OK
slot 05  G703-64K  :CARD SET ERROR   parameters set error
slot 06  FXS  :CARD SET OK           parameters set OK
slot 08  A/SYNC-128K  :CARD SET OK   parameters set OK
```

5.6 Reset Device Configuration to Default

After pressing 5 in the main menu, the system asks to recover to default.

```
YOU WILL RECOVER SYSTEM TO DEFAULT!
ARE YOU SURE(Y/N)?
```

Press Y or y to start setting the device to default. Once started, it can not be stopped.

```
Please Wait....
SYSTEM PARAMETER SAVE OK!
START CONFIG.............................
```

The system will check each card and display the result of recovery operation, success or failure.
Note 1: It is highly recommended that a new system, or system being configured for the first time, do a reset to default. This will help to place all the software settings for the hardware configuration into a known and stable state.

Note 2: Recovering to default performs the following configuration.
clear E1 card parameters
clear I/O card parameters
System clock mode set to recovery from E1A1
System backup mode-recovery disabled

5.7 Browse/Modify System Parameters

From the main menu select "6.SET SYSTEM". The display will show:

<< SYSTEM MENU >>	
1. VERSION	Display system version
2. CLOCK	Browse/ modify device clock
3. NMP/SNMP CONFIG	Modify NMP/SNMP configuration
4. E1 BACKUP	Modify backup mode of device E1
5. CHANGE PASSWORD	Modify system password
6. SETUP TIME	Modify device time
0. EXIT	Return to the input box of the main menu
INPUT SELECT:1	

Press 0 or ESC return to the main menu. Press 1 to 6 to get system info and/or modify the configuration.

5.7.1 Display system version

After pressing 1, the system will display the version number of the device.

```
ERM-MUX/PLUS version 1.25
```

5.7.2 Modify System Clock

Press 2 to enter the clock mode configuration menu. The menu will display:

<< SYSTEM CONFIG-CLOCK >>	
***1. E1A1 RECOVERY CLOCK**	E1A1 recover clock is source
2. E1A2 RECOVERY CLOCK	E1A2 recover clock is source
3. INT OSC	Internal OSC is source
4. IO CLOCK	Set I/O as external clock
5. EXTERNAL CLOCK	Set external clock
0. EXIT	Return to the upper menu
INPUT SELECT:1	

('*'indicates current setting.)
Press 1 to 5 to select the desired configuration, or press 0 or ESC to return to the upper menu. After configuration change by pressing key 1 to 5, the system will refresh the menu, and '*' will indicate the new setting. If IO card is selected for clock source, the system will check the I/O slots for presence of a compatible clock source cards.

For example, the system might show:

```
IO CLOCK VALID CARD SLOT:
slot 1  N64K/V35
slot 5  G703-64K
slot 7  A/SYNC-128K

CURRENT IO CLOCK SLOT:NULL
INPUT SLOT NO:
```

The listed cards are all candidates for providing clock source. If entering 5, the system will show:

```
INPUT SLOT NO:5
CURRENT IO CLOCK SLOT:5
```

Note: Only the clock from the first channel (CH1) of the selected slot can be used to apply clock for the whole system when the I/O card clock is used.

If "5. External Clock" is selected, the system will display the following to choose the source for the clock; either BNC or RJ-45.

```
<< SYSTEM CONFIG-EXTERNAL CLOCK-INTERFACE >>
 1. BNC                                  BNC interface
*2. RJ45                                 RJ45 interface
 0. EXIT                                 Return to the upper menu
INPUT SELECT:
```

('*'indicates current setting.)
Press 1 or 2 to select the configuration setting, or press 0 or ESC to return to the upper menu. Following the configuration keyin, the system will refresh the display, and the '*' will indicate the new setting.

5.7.3 Modify NMP/SNMP Parameter

Please press 3 to enter "3.NMP CONFIG". The menu will display:

```
<< SYSTEM CONFIG-NMP >>
*1. SELECT NMP          Enable in-band NMP and select E1 timeslot
 2. SELECT SNMP         SELECT SNMP and SET MAIN/SUB DEVICE
 3. IP ADDRESS          Modify device TCP/IP information
 4. DEVICE ADDRESS      Set up device address
 0. EXIT                Return to the input box of upper menu
INPUT SELECT:1
```

('*'indicates current setting.)
Press 1 to 4 to select configuration, or press 0 or ESC to return to the upper menu. Following the configuration keyin, the system will refresh the display, and the '*' will indicate the new setting.
Note 1: When configuring the management type, only one mode may be selected. If NMP is selected, SNMP cannot be used. If SNMP is selected, then NMP cannot be used.
Note 2: The NMP timeslot (in-band) can only be set on E1A1 channel.

5.7.3.1 Select E1 timeslot for in-band NMP

When NMP is selected, the in-band timeslot must also be configured. The display will show the available E1A1 timeslots. (Only one of the timeslots in E1A1 can be used for NMP.)

```
FREE TIMESLOT IS:
E1A1: 01-30             Idle timeslot in channel E1A1:1-30
CURRENT:E1A1-31         Currently used timeslot: 31
INPUT TIMESLOT:         Input the new timeslot
```

Press any key from 1 to 30 to replace timeslot 31. Press ESC to cancel modification and return to the upper menu.

5.7.3.2 Select SNMP

Press 2 to enter "SELECT SNMP" and modify SNMP mode parameters. The system will request the source of the SNMP control, either the Main Device, which is the SNMP agent on the system's CPU, or external control signal from the RS-485 control signal bus.

```
<< SYSTEM CONFIG-SNMP-CONFIG >>
*1. MAIN DEVICE                    Main device
 2. SUB DEVICE                     Sub device
 0. EXIT                           Return to the upper menu
INPUT SELECT:1
```

Please select MAIN DEVICE when network manager is directly connected to NMP/SNMP, and select SUB DEVICE when network manager is connected to RS 485 in the back of ERM-MUX/Plus.
Press 0 or ESC to return to the upper menu. Following the configuration key-in, the system will refresh the display, and the '*' will indicate the new setting.

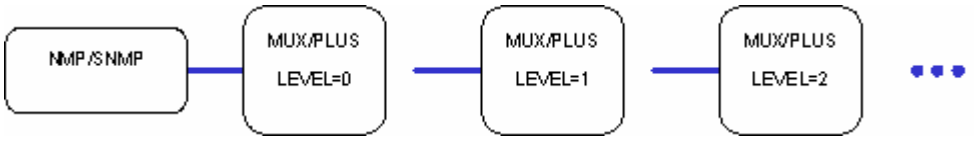
Note 1: There can be only one main device, which is where SNMP connects to.
Note 2: The Sub device function is reserved temporarily.

5.7.3.3 Modify Device TCP/IP Settings

The SNMP agent requires network settings for IP address, subnet mask, default gateway, etc. Please refer to Chapter 9 for details of the SNMP configuration and operation, including the web based management features.

5.7.3.4 Modify Device Address

Please press 4 to enter "4. DEVICE ADDRESS". The device address is used by the NMP when access local or remote equipment. Each chassis must have a unique address ID.
A device address is divided into 4 parts: "ADDRESS 1,ADDRESS 2,ADDRESS 3, LEVEL". ADDRESS 1/2/3 are the allocation addresses for NMP management system. For Level, please refer to below and input as follows:
Input 0 for level 0, when the device is connected to network manager system directly.
Input 1 for level 1, when there is one more ERM-MUX/Plus between the device and network manager system.
Input 2 or more when there are more than 1 cascaded MUX/Plus.



Key-in example:

```
CURRENT EQUIP ADDRESS:02,00,00,00

INPUT NEW EQUIP ADDRESS:
ADDRESS 01:2
ADDRESS 02:0
ADDRESS 03:0
LEVEL: 0
NEW EQUIP ADDRESS:02,00,00,00
```

5.7.4 Modify E1 Backup Mode

From the system menu, press 4 to modify E1 backup mode.

```
<<SYSTEM CONFIG-BACKUP E1>>
*1. DISABLE                          No backup is used
 2. SINGLE TO SINGLE                 1+1 or 2+2 backup mode setting
 3. SINGLE TO MULTI                  1+3, single to many backup mode
 4. CARD TO CARD                     E1 card protection mode
 0. EXIT                             exit to upper menu level
INPUT SELECT: 1
```

("*" indicates current setting) Press 1-4, to enter the setting, press 0, Enter or ESC to go back to the previous menu.

Press 1 or 4 and the system will change the current setting. The display will refresh and the star (*) symbol will indicate the new setting.
Press 2 or 3 and the system will move to the next detailed setting.

5.7.4.1 Modify Advanced E1 Backup Mode

From the system configuration backup E1 menu, press 2 to Enter the further setting for single to single backup.

```
<< SYSTEM CONFIG-BACKUP E1-SINGLE TO SINGLE>>
 1. E1A1 TO E1A2
 2. E1B1 TO E1B2
 3. E1-A1B1 TO E1-A2B2                2+2 backup
*4. E1A1 TO E1B1                      1+1 backup
 0. EXIT
INPUT SELECT:
```

("*" indicates current setting) Press 1-4, to enter the setting, press 0, Enter or ESC to go back to the previous menu.
Press 1-4 to choose the backup mode you require.
Press 1 to 4 and the system will change the current setting. The new option will appear a star (*) symbol.

5.7.4.2 Modify Advanced E1 Backup Mode

In "SYSTEM CONFIG-BACKUP E1" menu, press 3 to modify single to multi E1 backup mode you desire.

```
<< SYSTEM CONFIG-BACKUP E1-SINGLE TO MULTI>>
*1. E1A1 BACKUP
 2. E1A2 BACKUP
 3. E1B1 BACKUP
 4. E1B2 BACKUP
 0. EXIT
INPUT SELECT:
```

("*" indicates current setting) Press 1-4, to enter the setting, press 0, Enter or ESC to go back to the previous menu.
Press 1 to 4 and the system will change the current setting to the item you choose. Which ever E1 line you choose, the other E1 lines will all become backup lines to that chosen E1.

5.7.5 Password modification

From the main menu, press 6 to enter the system password modification.

```
PLEASE INPUT PASSWORD: ******
INPUT NEW PASSWORD (6 BYTES): ******
INPUT NEW PASSWORD AGAIN: ******
```

Note: Do Not forget the password or you will be locked out of the system. There is no password recovery procedure. The firmware chip holds the password and it must be replaced.

5.7.6 System time modification

From the main menu, press 7 to enter the system time modification.

```
CURRENT TIME: 03-09-11, 16-31-30
TIME FORMAT: YY-MM-DD, HH-MM-SS
INPUT NEW TIME: 06-01-10,17-33-00      (January 10, 2006 at 5:33PM)
```

5.8 Exit and Enter to Monitoring State

From the main setting menu press 0, system will pop-up a message window asking "Exit System". Press Y to exit the system and enter the monitoring state.

5.9 Category of Events and Alarms

From the terminal console, we can retrieve the Events and Alarms for the last 24 hours. The alarm events include:
CPU card
Major Alarm, Minor Alarm and Failure.
When alarms or any events occur to relative CPU card, the system will show the alarm in the relative alarm messages. If any failure occurs to the CPU card, the fail LED will be on, otherwise it will be off. The system will provide an alarm trigger for major and minor alarm output to control center via the alarm relays.

Alarms and Events of ERM-MUX-plus

Category	Card type	Alarms or Events
Events	1*E1 card 2*E1 card N64K/V35 card G703-64K card A/SYNC-128K card FXS card FXO card E&M card MAGNETO card CPU card	Equipment power on
		Equipment shutdown
		E1 SIGNAL NORMAL
		E1 SIGNAL LOSS
		E1 AIS NORMAL
		E1 AIS LOSS
		LOCAL E1 SYNC
		LOCAL E1 SYNC LOSS
		REMOTE E1 SYNC
		REMOTE E1 SYNC LOSS
		E1/CPU CARD ALARM, ACTIVE THE BACKUP MODE
		E1/CPU BACKUP E1 CARD ACTIVED
		CARD PLUG-OUT(Note: This is affected only to the unassigned card slot or any card type setting)
		CARD PLUG-IN(Note: This is affected only to the unassigned card slot or any card type setting)
Major Alarm	E1 card	Alarm
		Back to normal state
	CPU card	Alarm
		Back to normal state
	Power card	Alarm
		Back to normal state
Minor Alarm	Fans Alarm	Alarm
		Back to normal state
	I/O card alarm	Alarm
		Back to normal state
	G703 external clock	Sync Loss
		Sync normal

Chapter 6 Test and diagnosis

There are red or yellow alarm indicators on the front panel of each card, designed to indicate corresponding failure. For example, the "Sig Loss" on E1 card means that no E1 signal is received. "Sync LOSS" indicates that E1 frame synchronization errors have occurred.
This device is equipped with "E1 Local Loop" and "E1 To Remote Loop" functions, which can be used to facilitate the diagnostics and tests. These loops can be set and/or cancelled via programming (console intervention).

6.1 E1 Local Loop

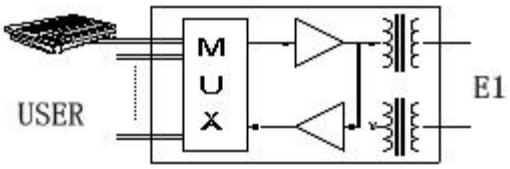


Figure 6.1: Local Loop

Near the external side to E1, the RX interface is disconnected from external E1 line (see figure 6-1), then looped back to TX. This aims to test the device at the user side. Connect a bit error rate tester (such as HCT-6000 BERT from CTC Union) to any user data port to check error rate.

6.2 E1 To Remote Loop

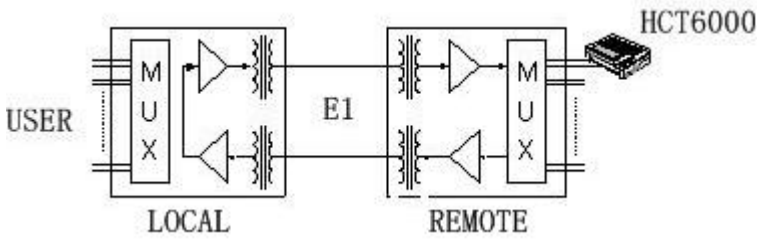


Figure 6.2: To Remote Loop

Near the external side to E1, the TX and RX are connected to form a 'To Remote Loop' (see figure 6-2), which is used to test the line and the device at the remote side. Connect a bit error rate tester (such as HCT-6000 BERT from CTC Union) to any user data port of the remote side device, and check for bit errors.

6.3 E1 End-to-End Bi-directional Test

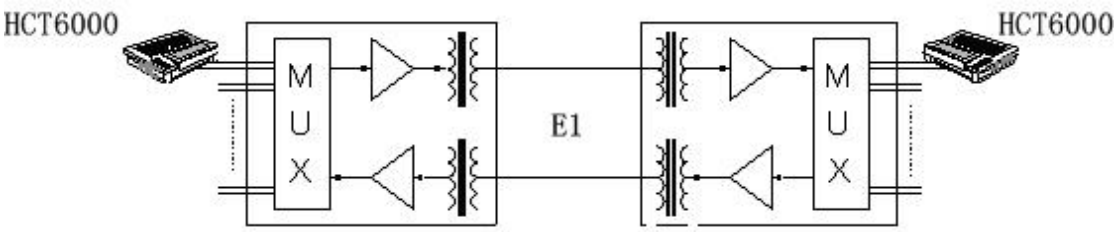


Figure 6.3: end-to-end bi-directional test

Connect BERT equipment to corresponding user ports of devices at both sides, perform error code testing, and check the data transmission quality for devices and relevant branches. Please see figure 6.3.

6.4 Loopback test for N64K/V35, A/SYNC-128K card

Figure 6.4 shows the schematic diagram for loop back test for these two kinds of cards. The tested loop is bi-directional, and two BERTs should be working fine.

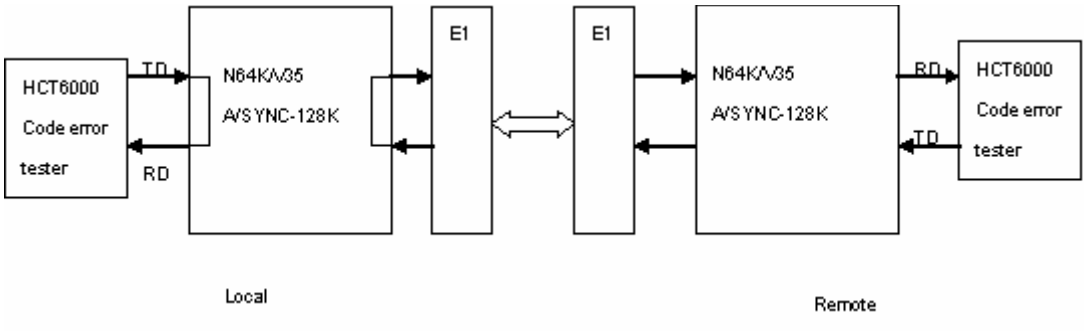


Figure 6.4

6.5 Loop Test for G703-64K Card

Figure 6.5 shows the schematic diagram for loop test for G703-64K card. The tested loop is a unidirectional loop.

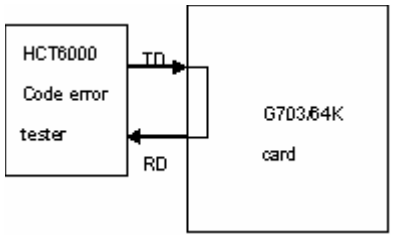
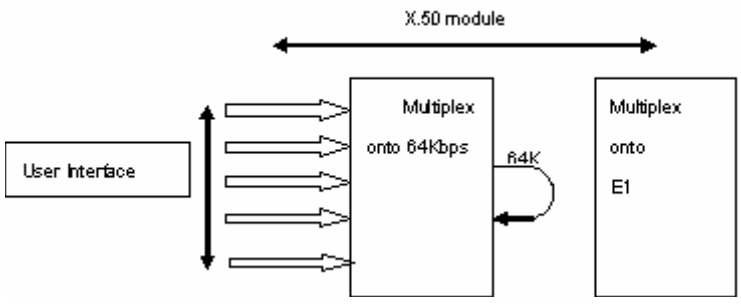


Figure 6.5

6.6 X.50 Module Loop Test.

X.50 Module loop test include two parts: One is 64K single direction loop (to user loop).The other is low-speed channel loop, (to user loop).

64K loop figure is below:



Chapter 7 Clock and Synchronization

7.1 Setting clock for whole machine

7.1.1 E1A1's Recover clock

MUX/PLUS will pick up recovery clock from E1A1 line received signal, and treat it as the clock source for the whole machine.

7.1.2 E1A2's Recover clock

MUX/PLUS will pick up recovery clock from E1A2 line received signal, and treat it as the clock source for the whole machine. (E1 card will be valid when it is in duplex E1).

7.1.3 Internal clock

This clock source is the crystal clock source in ERM-MUX/PLUS.

7.1.4 I/O card clock

I/O card clock is provided by CH1 data port of specified SLOT-n. The IO cards that support such functions include: N64K/V35 card, A/SYNC-128K card, SUB-E1 card, and G703-64K cards.

7.1.5 G703 external clock

The external clock source (Network Clock) will be connected to the BNC socket or RJ-45 socket (PIN4/PIN5) on back card for external clock, and so the G.703 external clock is the system source.

7.2 Connection between multiplexer and synchronous terminal device

In the following examples, the clock setting methods are described.

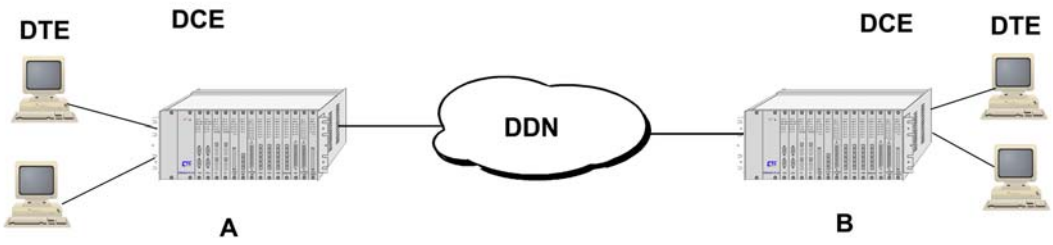


Figure 7.1 The direct connection between multiplexer and synchronization terminal device

Both of MUX/PLUS A and B can adopt recovery clock, or one recovery clock and other internal clock. All terminal devices can use RC and TC timing. Terminal device and MUX/PLUS are connected via straight cable.

7.3 MUX with synchronization tail circuit

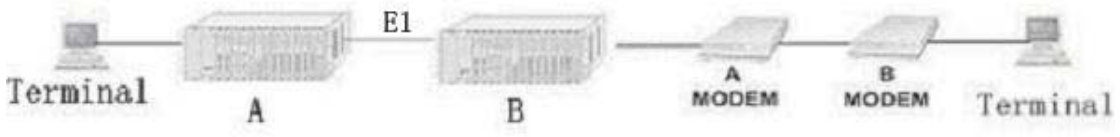


Figure 7.2 MUX/PLUS with synchronization tail circuit

The E1 clock of MUX/PLUS A is set with internal clock and MUX/PLUS B adopts recovery clock. The clock for MODEM A is set as external clock (receiving timing from data port) and the clock for MODEM B is set as the loop clock.
MODEM A and MUX/PLUS B are connected via cross-over cable (DCE to DCE), and all interface cable for terminals are straight (DCE to DTE).

Chapter 8 Application of Multiple E1 Ports

In a maximum configuration with 4 E1, digital cross connection can be made between any E1 and any timeslot. This device provides multi-E1 function, which provides larger space for user application. ERM-MUX/PLUS can be equipped with 1+1, 2+2, or 1+3 E1 lines backup.

8.1 Connection between MUX and device of public network

For this type of connection, various businesses can be connected to remote places via ERM-MUX/PLUS cross connection, and many kinds of media can be used, such as DDN network, PDH, SDH, PCM, digital microwave, and so on. The ERM-MUX/PLUS can also be used for local connections.

Figure 8.1

8.2 Connection with program controlled exchanger

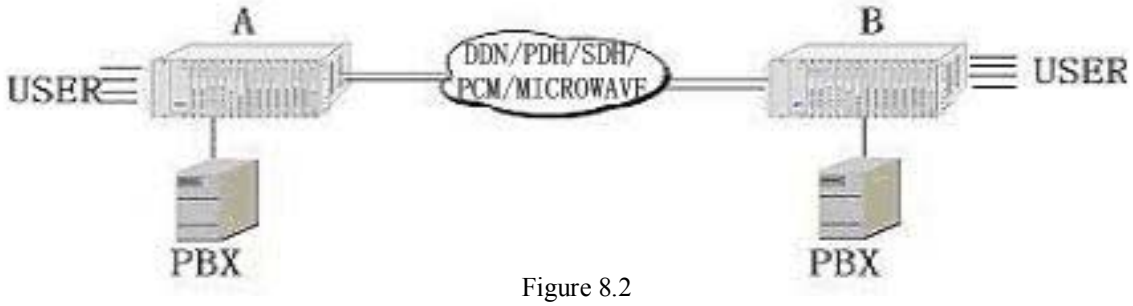


Figure 8.2

One E1 channel is used for the connection-in of program controlled exchanger (PBX), and other E1s are used for connecting with public networks.

8.3 Data connection among multiple points

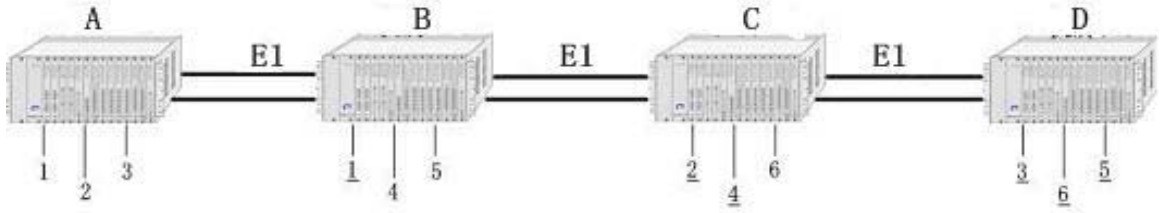


Figure 8.3

In the figure8.3, user data No.1 to No.6 can be in one time-slot or a group of time-slots. The network in figure 8.3 shows:
User data 1 is transmitted from Site A to B. user data 2 transmitted from Site A to Site C. user data 3 transmitted from Site A to Site D. user data 4 transmitted from Site B to Site C. user data 5 transmitted from Site B to Site D. user data 6 transmitted from Site C to Site D. You can make up the required data transmission system flexibly via using E1 channels. Additionally, the E1 clock at Site A is set as internal clock, while the main clocks for Site B/C/D should be set as recovery clock.

8.4 The extension and expansion of DDN (Data Distribution Network)

Use E1 card connections to converge users from Site B/C/D into one E1 channel, and connect them to DDN in centralized way, please refer to figure 8.4.

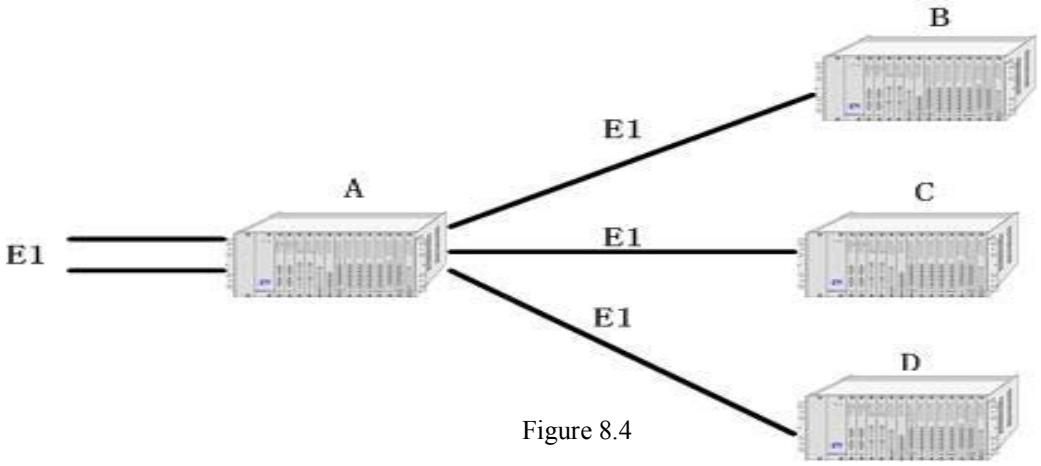


Figure 8.4

8.5 Implementation of multiplexing connection for voice/signaling

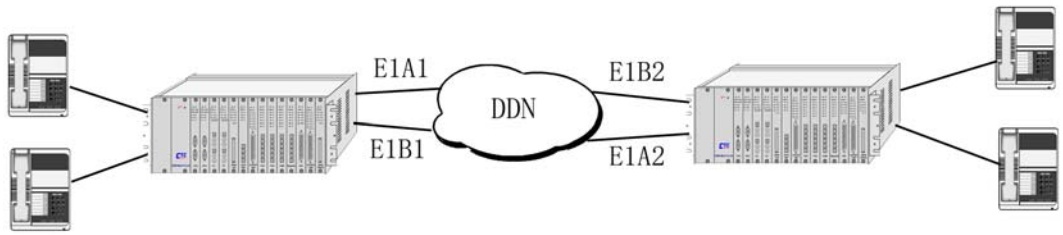


Figure 8.5

In the figure 8.5:
1. Connect telephone to ERM-MUX/PLUS via FXS card, and multiplex it to a time-slot of E1A1 and E1B1.
2. Connect the telephone of opposite side to ERM-MUX/PLUS via FXS card, and multiplex it to corresponding time-slot of E1A2 and E1B2.
3. For E1 circuits of both sides, E1A1 is connected to E1B1, and E1B2 is connected to E1A2.
A makes communication with A*, and B makes communication with B*.

8.6 Typical application of G703-64K card

In the figure 8.6
Signal from G703-64K card is sent to opposite side via E1 line, and then sent to ERM-MUX/PLUS from the opposite side via using E1 line. Users can be connected via using ERM-MUX/PLUS.

Figure 8.6

Chapter 9 SNMP Operation

9.1 SNMP Overview

9.1.1 Introduction

The Simple Network Management Protocol (SNMP) is one of many protocols in the Internet Protocol (IP) suite. SNMP is the protocol recommended specifically for the exchange of management information between hosts residing on IP networks. Network management allows you to monitor and control network devices remotely using conventional computer network technology.

The SNMP management functions of the ERM-MUX/PLUS are provided by an internal SNMP agent, which utilizes out-of-band communication over standard 10/100BASE-T Ethernet. The SNMP agent is compliant with the SNMPv1 standard. SNMP communication uses the User Datagram Protocol (UDP). UDP is a connectionless transport protocol, part of the IP suite. The SNMP protocol is an asynchronous command/response polling protocol and operates at the OSI Layer 7 (Layer 7 is the Application Layer. Other IP protocols that operate at this layer are FTP, Telnet, SMTP, etc.). All management traffic is initiated by the SNMP-based network management station. Only the addressed managed entity (agent) answers the polling of the management station.

9.1.2 SNMP Operations

The SNMP protocol includes four types of operations:

getRequest	Command for retrieving specific value of an “instance” from the managed node. The managed node responds with a **getResponse** message.
getNextRequest	Command for retrieving sequentially specific management information from the managed node. The managed node responds with a **getResponse** message.
setRequest	Command for manipulating the value of an “instance” within the managed node. The managed node responds with a **getResponse** message.
trap	Management message carrying unsolicited information on extraordinary events (that is, events which occurred not in response to a management operation) reported by the managed node.

9.1.3 The Management Information Base

The management information base (MIB) includes a collection of managed objects. Managed objects are defined as parameters that can be managed, such as specific information on device configuring or on performance statistics values.

The MIB includes the definitions of relevant managed objects (MIB variables) for the specific node. Various MIB's can be defined for various management purposes, types of equipment, etc. The management data itself is a collection of integer, string and MIB address variables that contain all the information necessary to manage the node.

A leaf object’s definition includes the range of instances (values) and the "access" rights:

Read-only	Instances of an object can be read, but cannot be set.
Read-write	Instances of an object can be read or set.
Write-only	Instances of an object can be set, but cannot be read.
Not accessible	Instances of an object cannot be read, nor set.

9.1.4 MIB Structure

The MIB has an inverted tree-like structure (root over leaves), with each definition of a managed instance forming one leaf, located at the end of a branch of that tree. Each "leaf" in the MIB is reached by a unique path, therefore by numbering the branching points, starting with the top, each leaf can be uniquely defined by a sequence of numbers. The formal description of the managed objects and the MIB structure is provided in a special standardized format, called Abstract Syntax Notation 1, or ASN.1 (pronounced A-S-N dot one).

Since the general collection of MIB's can also be organized in a similar structure, under the supervision of the Internet Activities Board (IAB), any parameter included in a MIB that is recognized by the IAB is uniquely defined.

To provide the flexibility necessary in a global structure, MIB's are classified in various classes (branches), one of them being the experimental branch, another being the management (mgmt) branch, and yet another the group of private (enterprise-specific) branch. Under the private enterprise-specific branch of MIB's, each enterprise (manufacturer) can be assigned a number, which is its enterprise number. The assigned number designates the top of an enterprise-specific sub-tree of non-standard MIB's. Within this context, CTC Union has been assigned the enterprise number 4756. Under this scheme, the path to CTC Union's Enterprise branch would be:

`iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).ctcu(4756)`

Enterprise-specific MIB's are published and distributed by their creators, who are responsible for their contents. Specific information regarding the CTC Union's sub-tree are available from CTC Union's Research and Development Division.

The MIB supported by the ERM-MUX/PLUS SNMP Agent follows RFC 1213 (MIB-II standard).

9.1.5 SNMP Communities

To enable the delimitation of management domains, SNMP uses "communities". Each community is identified by a name, which is an alphanumeric string of up to 255 characters defined by the user. Any SNMP entity (this term includes both managed nodes and management stations) is assigned by its user a community name. In parallel, the user defines for each SNMP entity a list of the communities which are authorized to communicate with it, and the access rights associated with each community (this is the SNMP community name table of the entity).

In general, SNMP agents support two types of access rights:

Read-only	the SNMP agent accepts and processes only SNMP **getRequest** and **getNextRequest** commands from management stations which have a read-only community name.
Read-write	the SNMP agent accepts and processes all the SNMP commands received from a management station with a read-write community name. SNMP agents are usually configured to send traps to management stations having read-write communities, but may also send to read-only stations as well.

9.2 Installation Introduction

This section will explain in detail the proper procedure for installation and operation of the ERM-MUX/PLUS-SNMP feature for the ERM-MUX/PLUS. The ERM-MUX/PLUS-SNMP feature provides the ability to configure and monitor the ERM-MUX/PLUS Rack via Telnet terminal based management, web based browser and via industry standard SNMP (Simple Network Management Protocol). The ERM-MUX/PLUS-SNMP feature is designed to be plugged into the ERM-MUX/PLUS CPU card as a daughter board.

9.2.1 Required tools and supplies

1. A No.2 Philips screwdriver for mounting the SNMP daughter board to the CPU card.

9.2.2 Procedure (Please refer to the attached drawing)

1. Inspect the contents of the ERM-MUX/PLUS-SNMP kit. It should contain three(3) M3x8mm screws, one(1) SNMP board and one(1) MIB file floppy diskette or CDROM.
2. The installation of the ERM-MUX/PLUS-SNMP feature card may be performed while the ERM-MUX/PLUS unit is fully powered. However, to avoid excessive network down time, the entire unit should be removed from service. From the front of the ERM-MUX/PLUS unit, loosen the two captive thumb-screws from the Primary CPU card and remove the card. (Please refer to Figure 1, ERM-MUX/PLUS E1 Rack, CPU Card removal/replacement.)
3. Place the CPU card on a smooth hard surface. Preferably place the card on anti-static material such as an anti-static bag. Please note the outlined location for the SNMP card on the CPU card. (Refer to Figure 3.) Align exactly the 20 pin header of the SNMP board to the socket on the CPU card and seat the SNMP card. Use the supplied three screws to secure the SNMP card. Do not over tighten the screws. (Refer to Figure 4.)
4. Carefully slide the ERM-MUX/PLUS-CPU Card back into the rack case until fully seated and tighten the captive thumb-screws. (Refer to Figure 1.)
5. Refer to Figure 1. The DB9 Female connector labeled "LOC Ctrl" is for connection to a standard terminal device or PC running a terminal emulation program such as HyperTerminal™. Connection to the PC's RS-232 DTE is via a standard 9 pin serial one-to-one cable. The connector labeled "NM Ctrl" is for connection to PC COM port that is running the Windows® based NMP management program and will not be further discussed in this document.
6. Refer to Figure 2, the rear panel of the ERM-MUX/PLUS, the RJ-45 connector, labeled "SNMP", is for a direct 10/100Base-TX Ethernet connection to a HUB device. The Ethernet port provides the connection to the network on which the SNMP management workstation is located. The SNMP feature is now ready to be configured.

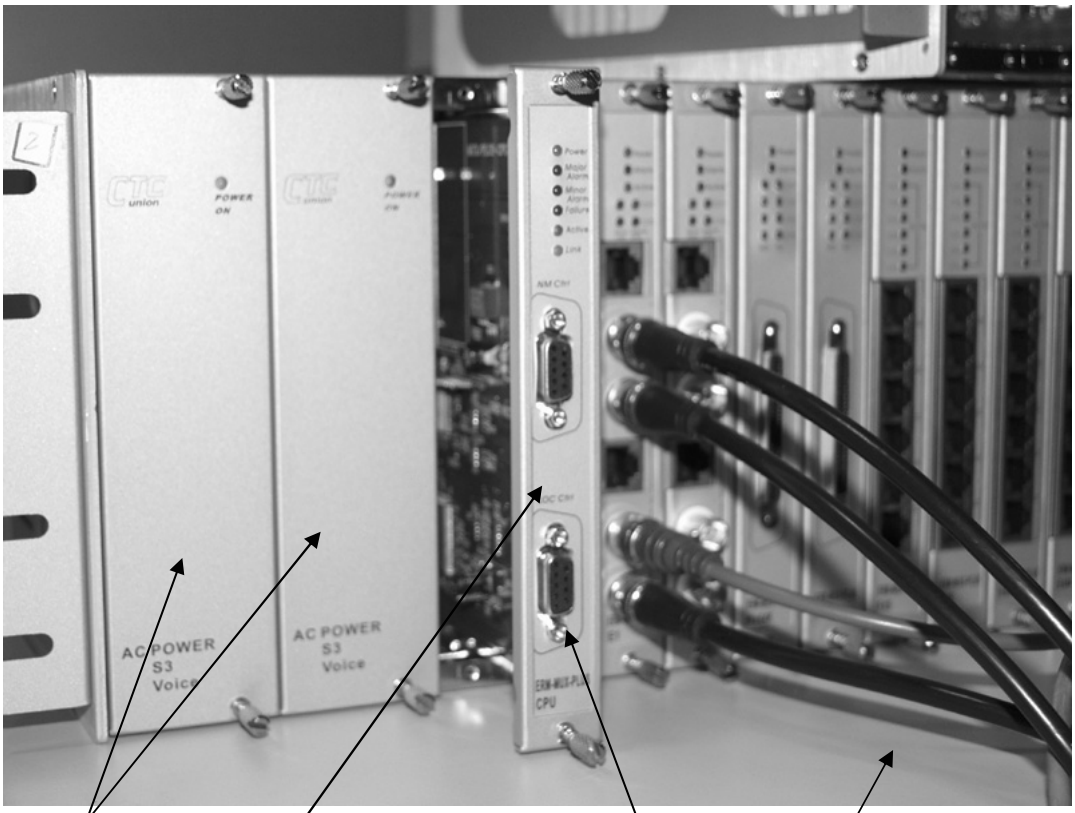


Figure 1, ERM-MUX/PLUS E1 Rack, CPU Card removal/replacement

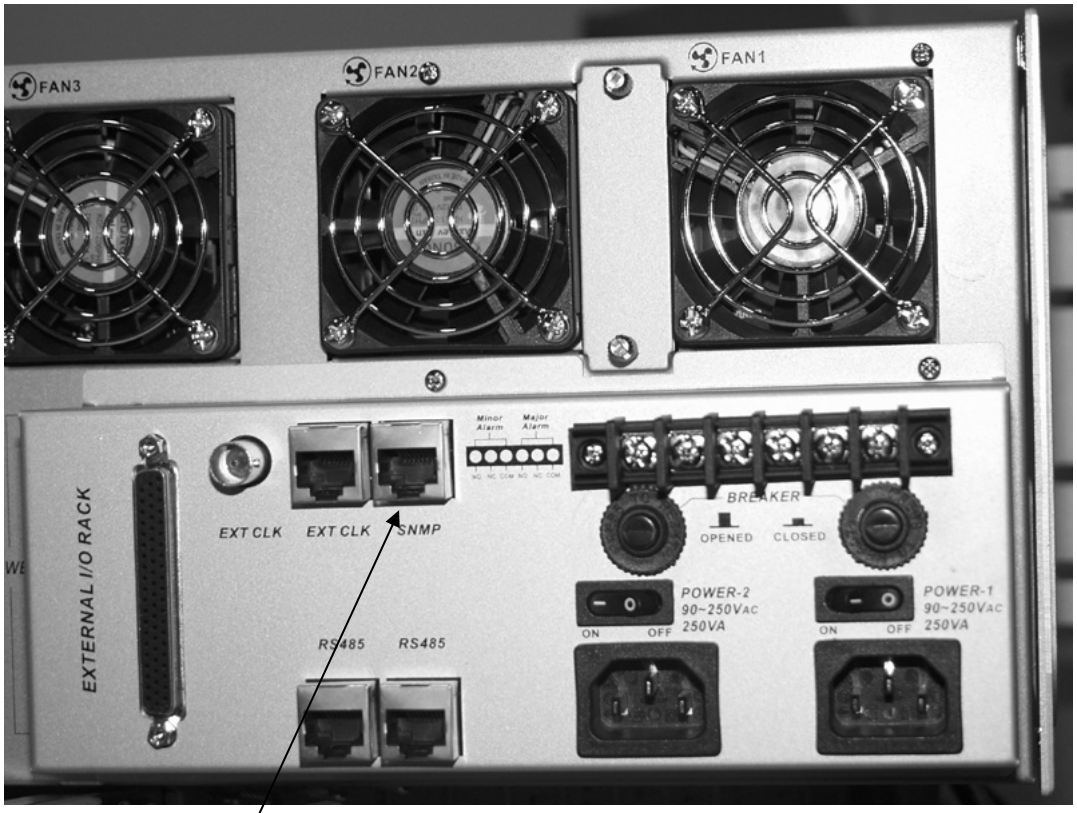


Figure 2, ERM-MUX/PLUS SNMP's Ethernet Connector

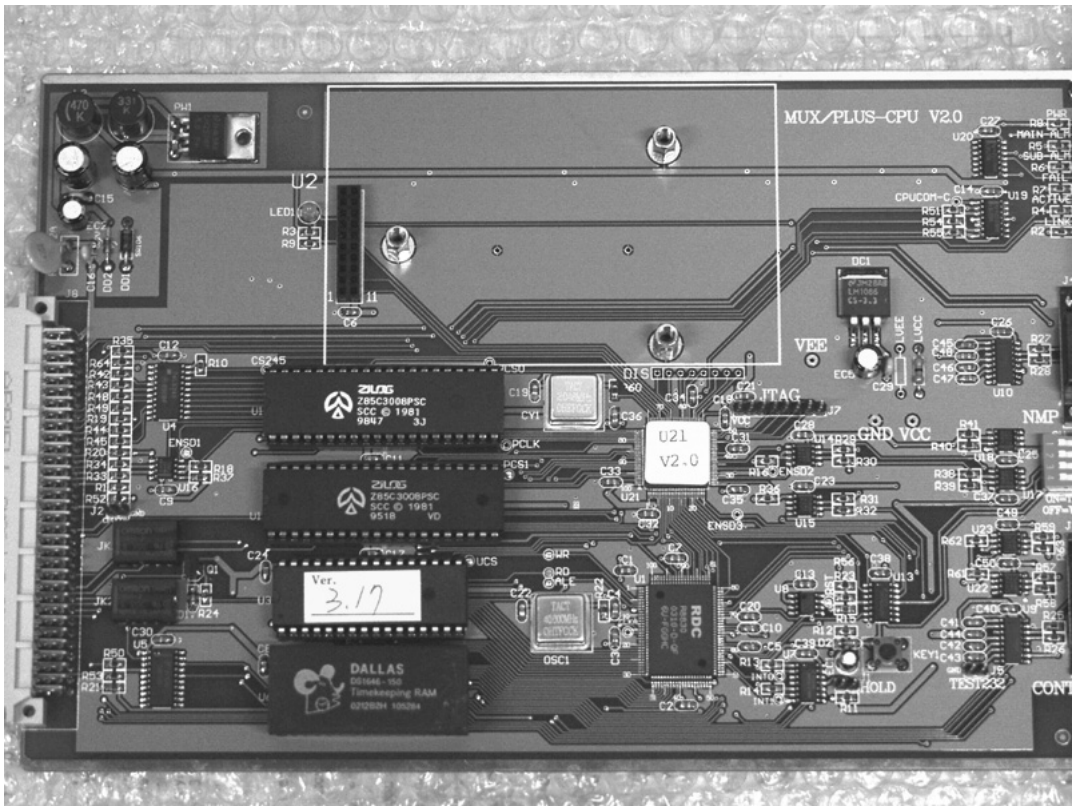


Figure 3, ERM-MUX/Plus CPU card Without SNMP feature.

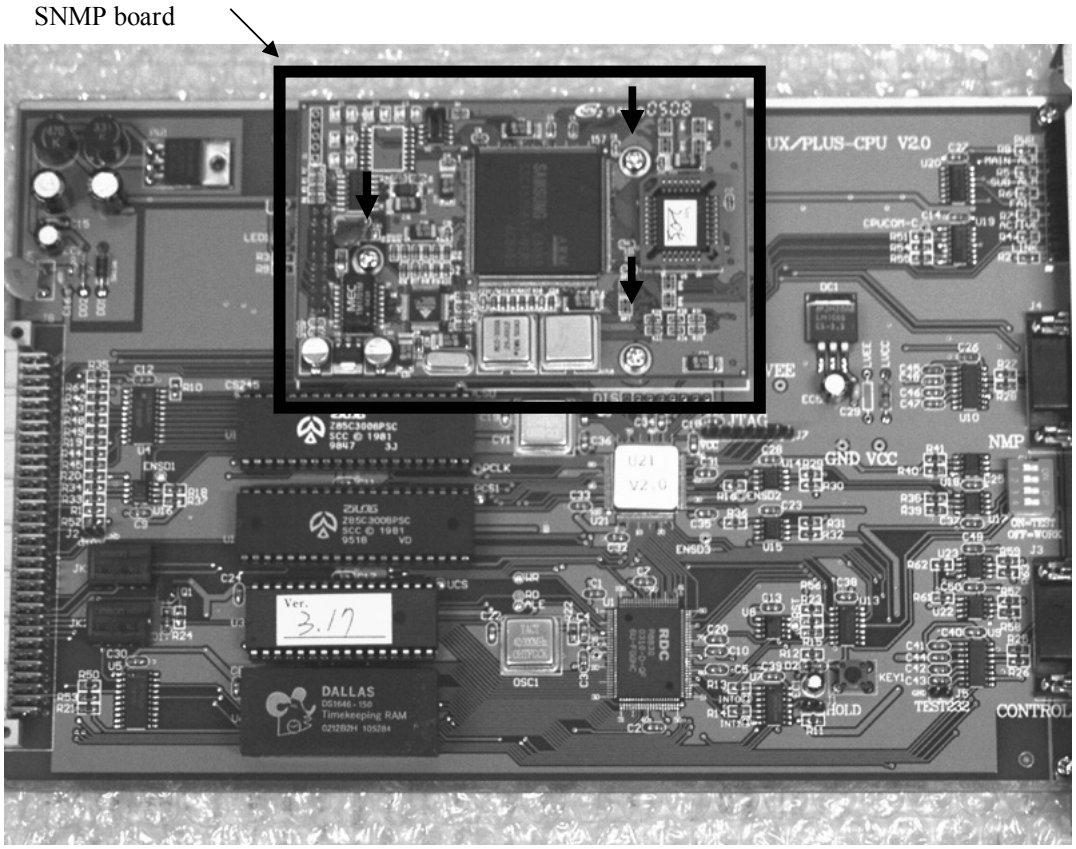


Figure 4, ERM-MUX/Plus CPU card With SNMP feature installed.

9.2.3 Configuration General

The ***ERM-MUX/PLUS-CPU*** Control Port (labeled Loc Ctrl on the card face) is an RS-232 asynchronous console terminal port designed to facilitate setup of all parameters through the use of a standard text based terminal or any terminal emulation program running on a Personal Computer.

9.2.4 Terminal Connection

A notebook computer has become an invaluable tool of the Systems Engineer. Connection to the computer is very simple. The ***ERM-MUX/PLUS-CPU*** acts as a DCE to the PC's DTE communications port. The only hardware required is a DB9-pin one-to-one, male to female cable. A convenient application, provided with the Microsoft Windows 9X or NT® operating systems, is "HyperTerminal ™". Set the properties to match the ***ERM-MUX/PLUS-CPU*** control port factory defaults as follows: Baud=9600, Data bits=8, Parity=None, Stop bits=1, and handshaking=none. Make the appropriate connections, start the terminal application, apply power to the ***ERM-MUX/PLUS-CPU***, then press SPACE or ENTER after about 30 seconds on the PC keyboard. If you are using "HyperTerminal ™" the display should look like the following.

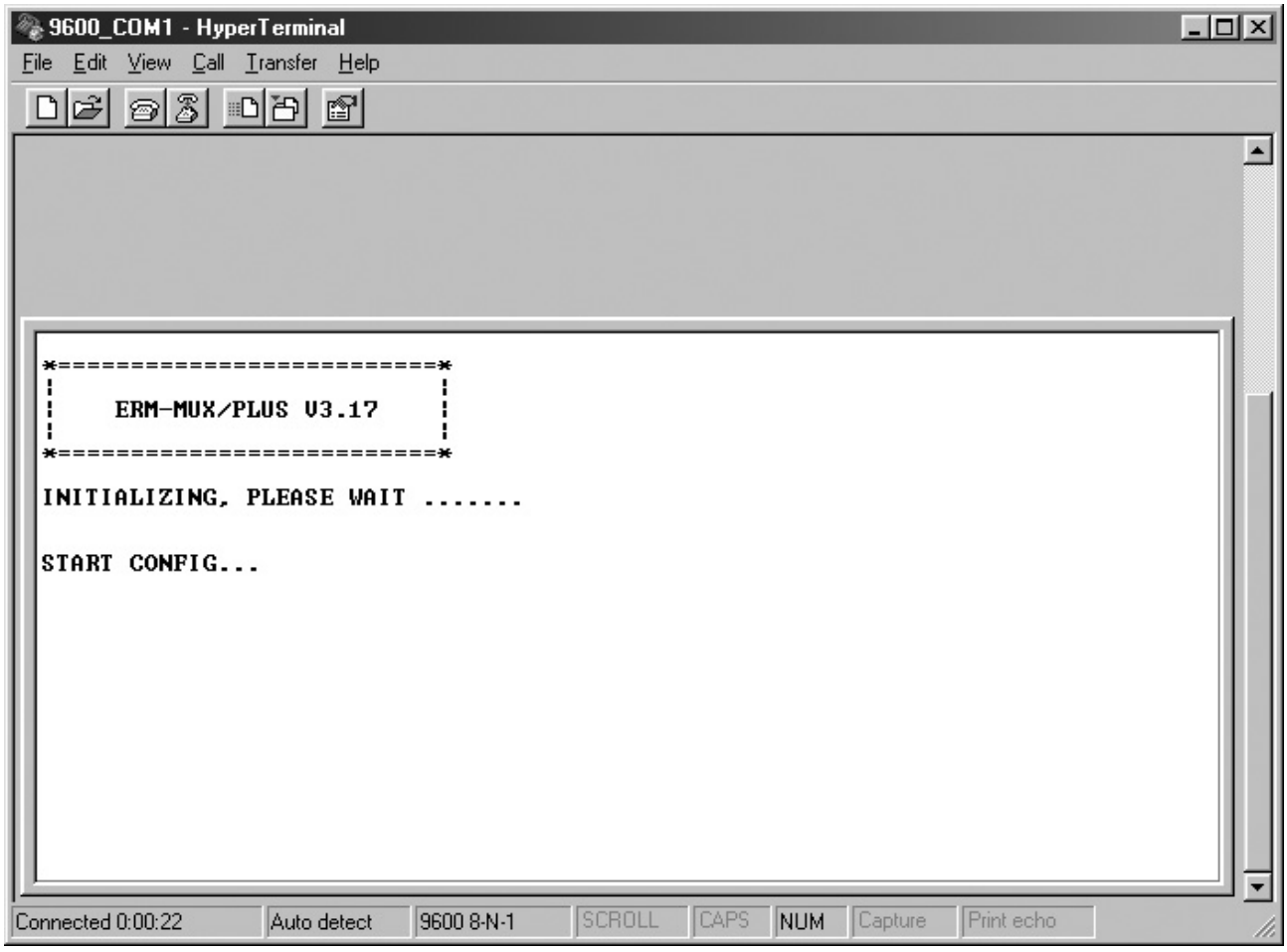


Figure 2-1, Example of terminal display

9.2.5 SNMP Configuration (terminal)

The following section will detail actual displays with descriptions of parameter settings via relevant key commands.

This is the first screen seen after connecting. Normally this will take between 30 to 45 seconds to display after initial power on.

```
*==========================*
|                          |
|    ERM-MUX/PLUS V3.17    |
|                          |
*==========================*

INITIALIZING, PLEASE WAIT .......


START CONFIG.............


C/B  :BOARD SET OK
E1A  E1(CHANNEL1+1)  :BOARD SET OK
E1B  E1(CHANNEL1+1)  :BOARD SET OK
slot 1  N64/V35  :BOARD SET OK
slot 2  N64/V35  :BOARD SET OK
slot 3  FXS  :BOARD SET OK
slot 4  FXS  :BOARD SET OK
slot 5  E&M  :BOARD SET OK
slot 6  E&M  :BOARD SET OK
slot 7  FXO  :BOARD SET OK
slot 8  FXO  :BOARD SET OK
slot 9  A/SYNC-128K  :BOARD SET OK
.
.
<snip> (it may take a number of Enter keys to get by here)
.
.
PLEASE INPUT PASSWORD:
```

The default password is six (6) ones, 111111.
Through out the menu system the following keys have special meanings:
"ENTER": The Enter key accepts the value displayed in the brackets.
Any item number will select directly.
"0": The zero key returns to the higher menu level.
Now we will follow the examples to setup the SNMP option.

```
<< MAIN MENU >>
     1. E1  CONFIG
     2. I/O CONFIG
     3. DISPLAY CONFIG
     4. CONFIG
     5. SET DEFAULT
     6. SET SYSTEM
     7. BERT
     0. EXIT
INPUT SELECT:
```

Enter '6' to Set System parameters

```
<< SYSTEM MENU >>
     1. VERSION
     2. CLOCK
     3. NMP MODE
     4. E1 BACKUP
     5. CHANGE PASSWORD
     6. SETUP TIME
     7. SETUP EXTEND BOX
     0. EXIT
INPUT SELECT:3                          #select 3 NMP Mode
```

There are two management modes for the ERM-MUX/Plus, NMP mode uses proprietary Windows® based software and serial connection to the NMP Ctrl port, while SNMP mode uses the industry standard SNMP protocol to manage the rack. Only one mode may be enabled at a time.

```
 NMP MODE:MAJOR
UP:NMP
DOWN:E1A1:NULL  E1A2:NULL  E1B1:NULL  E1B2:NULL

 << SYSTEM CONFIG-NMP MODE >>
    *1. MAJOR JOINT
     2. SUB JOINT
     3. DISABLE NMP
     4. IP ADDRESS
     5. DEVICE ADDRESS
     0. EXIT
INPUT SELECT:1                          #select 1 to enter major joint

 << SYSTEM CONFIG-NMP MODE-MAJOR >>
     1. UP
     2. DOWN
     0. EXIT
INPUT SELECT:1                          #select 1 to enable management

 << SYSTEM CONFIG-NMP MODE-MAJOR-UP >>
    *1. LOCAL NMP
     2. SNMP
     0. EXIT
INPUT SELECT:2                          #select 2 to switch to SNMP feature

 << SYSTEM CONFIG-NMP MODE-MAJOR-UP >>
     1. LOCAL NMP
    *2. SNMP
     0. EXIT
INPUT SELECT:0                          #select 0 to exit the Major-up menu

 << SYSTEM CONFIG-NMP MODE-MAJOR >>
     1. UP
     2. DOWN
     0. EXIT
INPUT SELECT:0                          #select 0 to exit the major menu

NMP MODE:MAJOR
UP:SNMP
DOWN:E1A1:NULL  E1A2:NULL  E1B1:NULL  E1B2:NULL

 << SYSTEM CONFIG-NMP MODE >>
    *1. MAJOR JOINT
     2. SUB JOINT
     3. DISABLE NMP
     4. IP ADDRESS
     5. DEVICE ADDRESS
     0. EXIT
INPUT SELECT:4                          #select 4 to enter agent setup
```

Now the IP address, subnet mask, default gateway, community strings, TFTP server IP, path, and management workstation information must be set to complete the agent configuration. Follow the key-in example below. Start by keying in four(4) for IP Address.

```
CURRENT IP ADDR:.192.168.000.001
INPUT NEW IP ADDR:172.24.1.199            #keyin the IP address of agent
CURRENT IP ADDR:.172.024.001.199
CURRENT SUBNET MASK:.255.255.255.000
INPUT NEW SUBNET MASK:255.255.0.0         #keyin the subnet mask of agent
CURRENT SUBNET MASK:.255.255.000.000
CURRENT GATEWAY IP:.000.000.000.000
INPUT NEW GATEWAY IP:172.24.190.254       #keyin the default gateway
CURRENT GATEWAY IP:.172.024.190.254
CURRENT TFTP SERVER IP:.000.000.000.000
INPUT NEW TFTP SERVER IP:172.24.1.126     #keyin the TFTP server's IP
CURRENT TFTP SERVER IP:.172.024.001.126
CURRENT TFTP PATH:00000000000000000000
INPUT NEW TFTP PATH:ermmv205.bin          #keyin path of upload file
CURRENT TFTP PATH: ermmv205.bin
CURRENT COMMUNITY RD/WR:000000
INPUT NEW COMMUNITY RD/WR:secret          #keyin the READ/WRITE string
CURRENT COMMUNITY RD/WR:secret
CURRENT COMMUNITY RD ONLY:000000
INPUT NEW COMMUNITY RD ONLY:public        #keyin the READ ONLY string
CURRENT COMMUNITY RD ONLY:public
CURRENT ACCESS IP ADDR #1:.000.000.000.000
INPUT NEW ACCESS IP ADDR #1:172.24.1.251  #keyin the manager's IP address
CURRENT ACCESS IP ADDR #1:.172.024.001.251
CURRENT COMMUNITY RD/WR(E/F):F
INPUT NEW COMMUNITY RD/WR(E/F):E          #this manager has READ/WRITE access
CURRENT COMMUNITY RD/WR(E/F):E            # E for 'enable', F for 'disable'
CURRENT COMMUNITY RECEIVE EN/DIS(E/F):F
INPUT NEW COMMUNITY RECEIVE EN/DIS(E/F):F #enable traps to this manager
CURRENT COMMUNITY RECEIVE EN/DIS(E/F):F   # E for 'enable', F for 'disable'
CURRENT ACCESS IP ADDR #2:.000.000.000.000
INPUT NEW ACCESS IP ADDR #2:n             #skip second manager configuration
CURRENT COMMUNITY RD/WR(E/F):F
INPUT NEW COMMUNITY RD/WR(E/F):n          #skip
CURRENT COMMUNITY RECEIVE EN/DIS(E/F):F
INPUT NEW COMMUNITY RECEIVE EN/DIS(E/F):n #skip
CURRENT ACCESS IP ADDR #3:.000.000.000.000
INPUT NEW ACCESS IP ADDR #3:n             #skip third manager configuration
CURRENT COMMUNITY RD/WR(E/F):F
INPUT NEW COMMUNITY RD/WR(E/F):n          #skip
CURRENT COMMUNITY RECEIVE EN/DIS(E/F):F
INPUT NEW COMMUNITY RECEIVE EN/DIS(E/F):n #skip
CURRENT ACCESS IP ADDR #4:.000.000.000.000
INPUT NEW ACCESS IP ADDR #4:n             #skip forth manager configuration
CURRENT COMMUNITY RD/WR(E/F):F
INPUT NEW COMMUNITY RD/WR(E/F):n          #skip
CURRENT COMMUNITY RECEIVE EN/DIS(E/F):F
INPUT NEW COMMUNITY RECEIVE EN/DIS(E/F):n #skip
CURRENT TELNET MANAGER PASSWORD:0000
INPUT NEW TELNET MANAGER PASSWORD:0000    #modify the Telnet access password
CURRENT TELNET MANAGER PASSWORD:0000

 << SYSTEM CONFIG-NMP MODE >>
     1. MAJOR JOINT
     2. SUB JOINT
     3. DISABLE NMP
     4. IP ADDRESS
     5. DEVICE ADDRESS
     0. EXIT
INPUT SELECT:0                            #exit the config NMP mode
```

Currently all the settings for the SNMP are residing in RAM only. If power is lost now, the settings will all be lost and revert to those saved in Flash. Therefore the next and final step is to save the SNMP settings.

The following screen captures show exiting the configuration menus and saving the configuration.

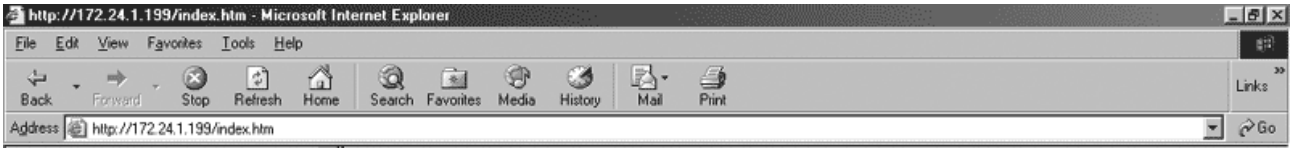
```
<< SYSTEM MENU >>
     1. VERSION
     2. CLOCK
     3. NMP MODE
     4. E1 BACKUP
     5. CHANGE PASSWORD
     6. SETUP TIME
     7. SETUP EXTEND BOX
     0. EXIT
INPUT SELECT:0                                  #exit the System Menu

 << MAIN MENU >>
     1. E1  CONFIG
     2. I/O CONFIG
     3. DISPLAY CONFIG
     4. CONFIG
     5. SET DEFAULT
     6. SET SYSTEM
     7. BERT
     0. EXIT
INPUT SELECT:4                                  #select 4 to save the settings


SYSTEM WILL BE CONFIGED,ARE YOU SURE(Y/N)?y  #answer 'y' for yes

START CONFIG.............                       #configuration is written to Flash
```

The SNMP feature is now configured. You may access the ERM-MUX/Plus via Telnet, with web browser, or Network Management software.

9.3 Web Based Management System

Now that the agent has been completely configured, we can attach with any standard web browser to the ERM-MUX/Plus. The following screen captures are from a Microsoft Internet Explorer browser.

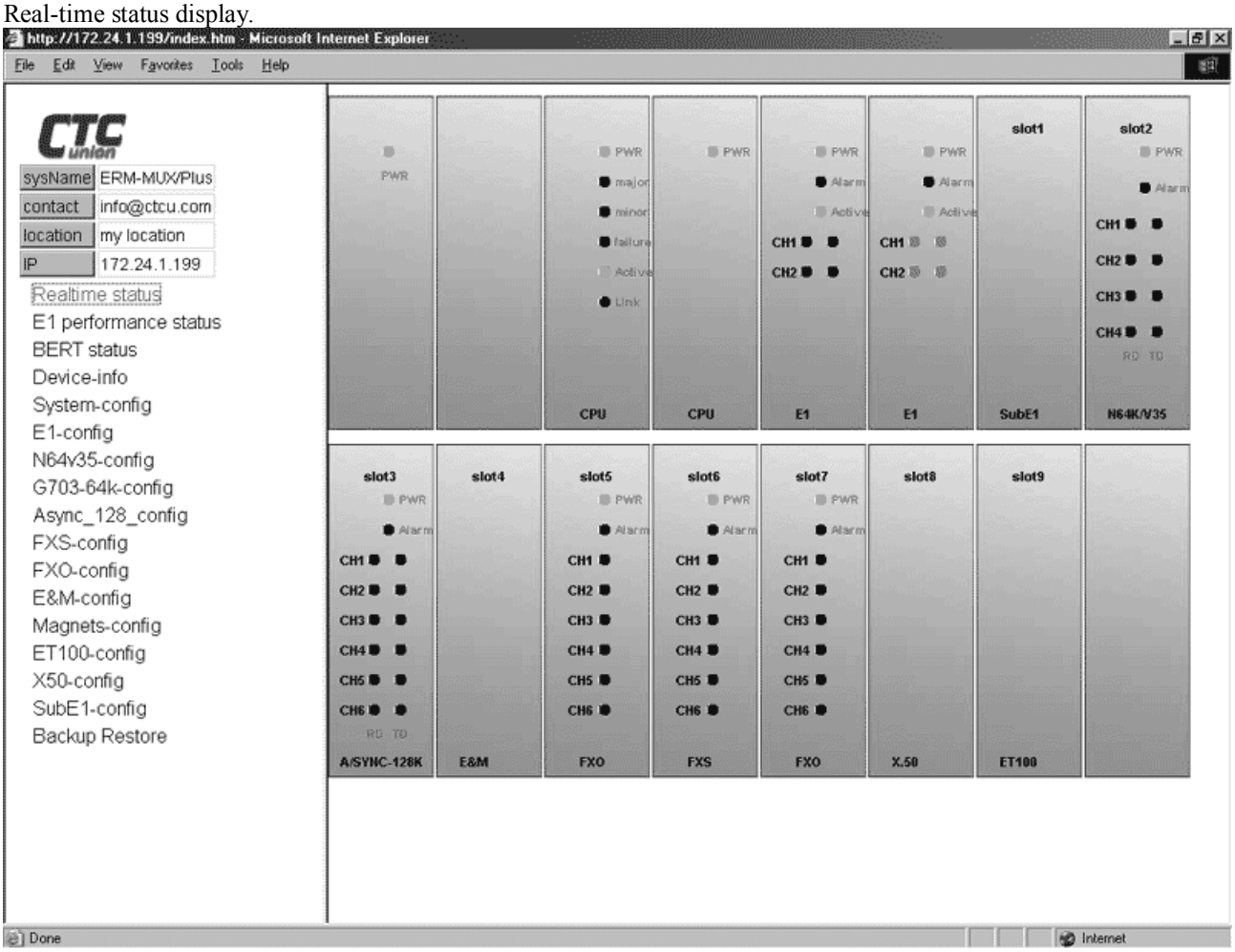
In the Address bar, key-in the http address of the ERM-MUX/Plus.


http://172.24.1.199/index.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites Media History Mail Print
Links
Address http://172.24.1.199/index.htm
Go

A login dialogue will follow. The default username and password are 'admin' and '0000' (4 zeros).

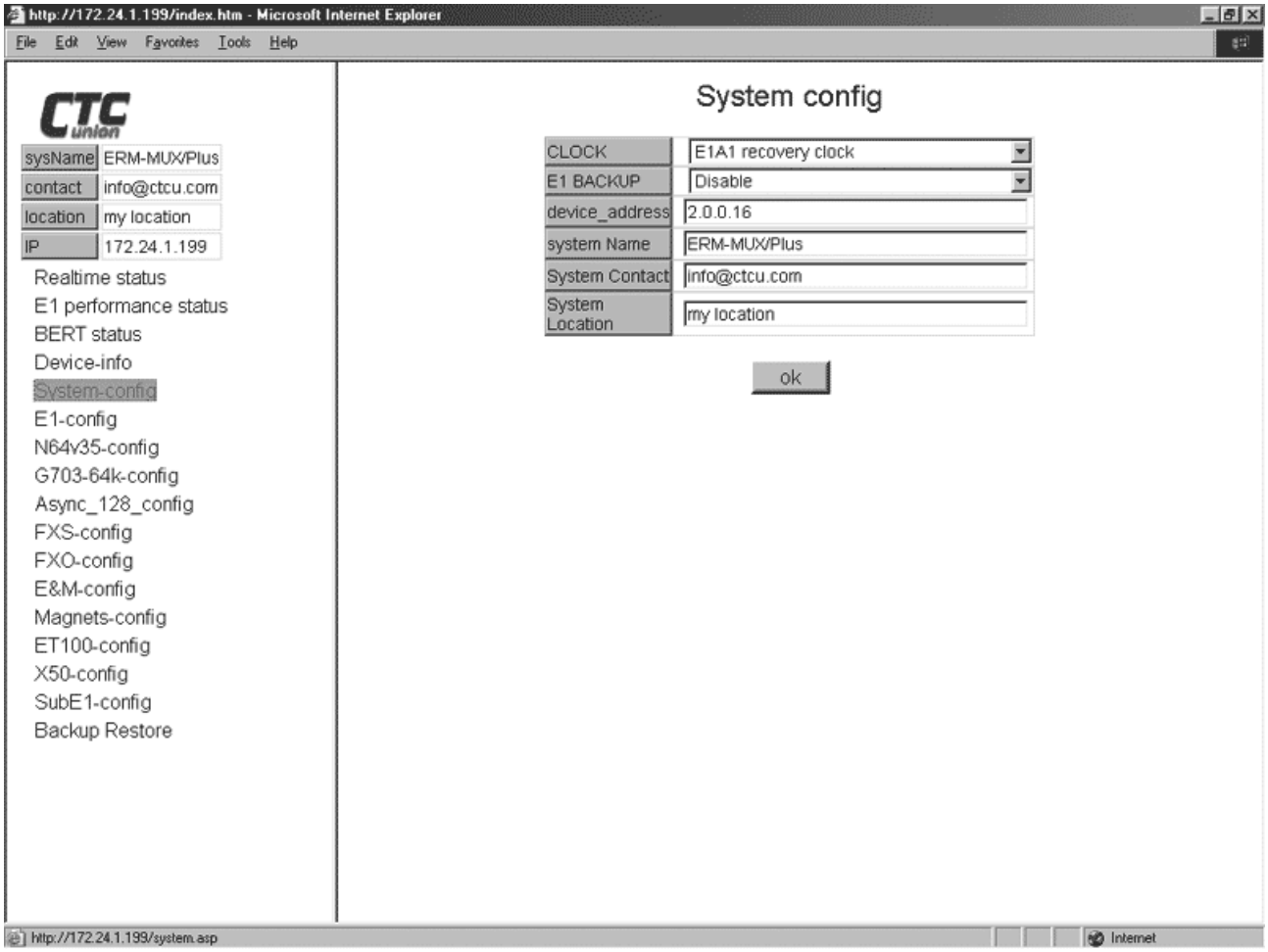
Enter Network Password
This secure Web Site (at 172.24.1.199) requires you to log on.
Please type the User Name and Password that you use for ERM-MUX-PLUS.
User Name
admin
Password
Save this password in your password list
OK
Cancel

Real-time status display.



The main screen is divided into two frames. The left frame contains the system information and the menu of monitoring and configuration items. The right frame will show the appropriate parameters for the selected monitoring or configuration item. The default screen shows the real time rack status in a graphical display. To return to this screen anytime, select **Real-time status**.

Set the System Config information. Click the **System-config** item in the left frame.

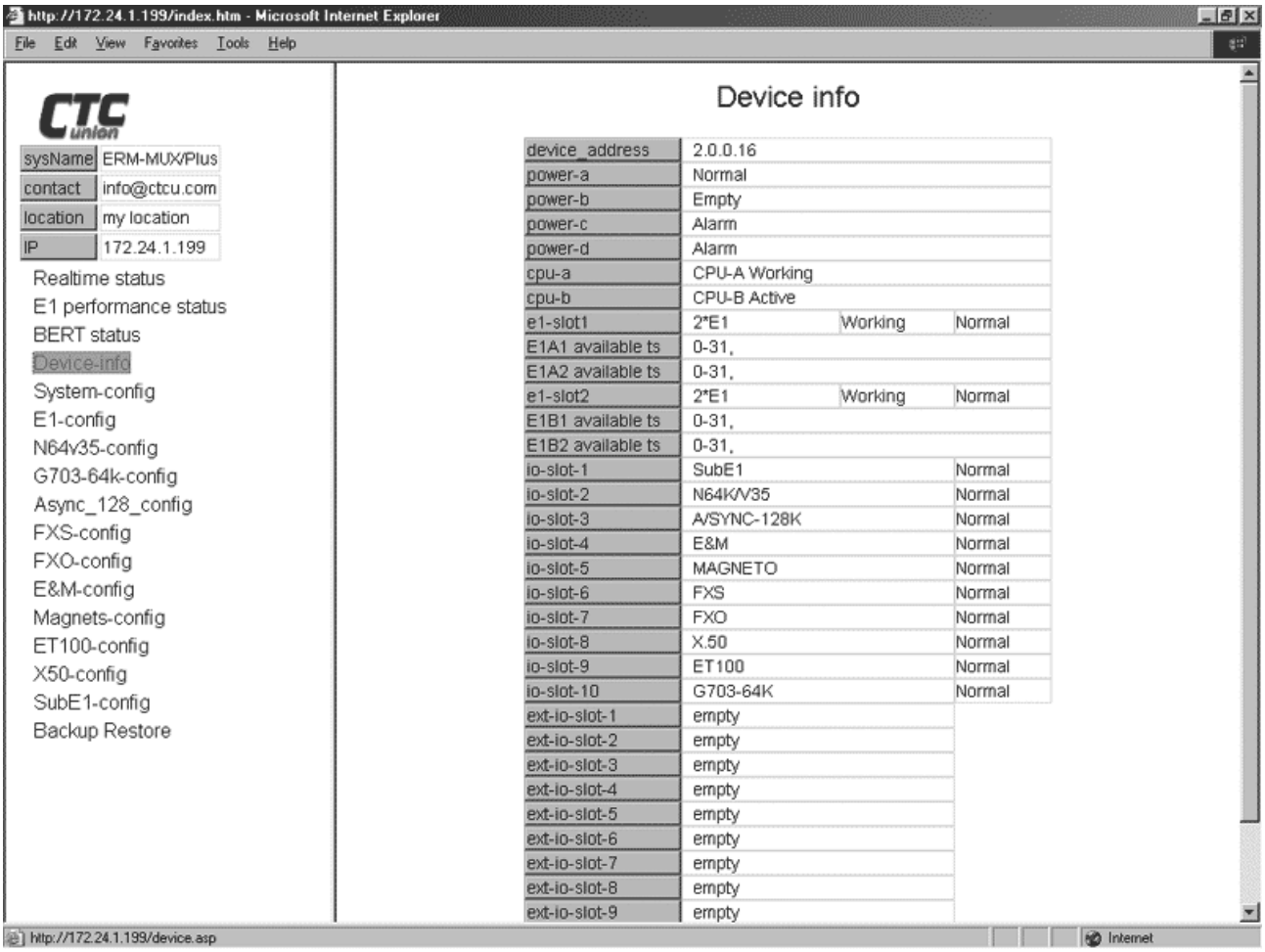


Select the E1 clock mode from the pull-down menu. Enable or disable E1 backup. Set the device address (2.0.0.16). Give the system a name. Enter the system contact information and system location. Click 'OK' when finished.

Please note the following:
1. The E1 clock source may be set in internal oscillator, set to recovery from any one of the E1A channels, set from one of the IO cards, or externally from clock connectors on the chassis rear.

2. For full redundant E1 backup, use the 'Card to Card' option. Then any failure of E1 link or card on E1A, will fallback to E1B card.

Now click **Device-info** to view all the installed options in the ERM-MUX/Plus rack.



Please note the following:

1. The ERM-MUX/Plus has the ability to add an expansion chassis to hold additional I/O cards, if required. The Expansion chassis also may hold 2 power modules. The main chassis power modules are referred to as 'power-a' and 'power-b' from left to right, while the expansion chassis power modules are 'power-c' and 'power-d'.

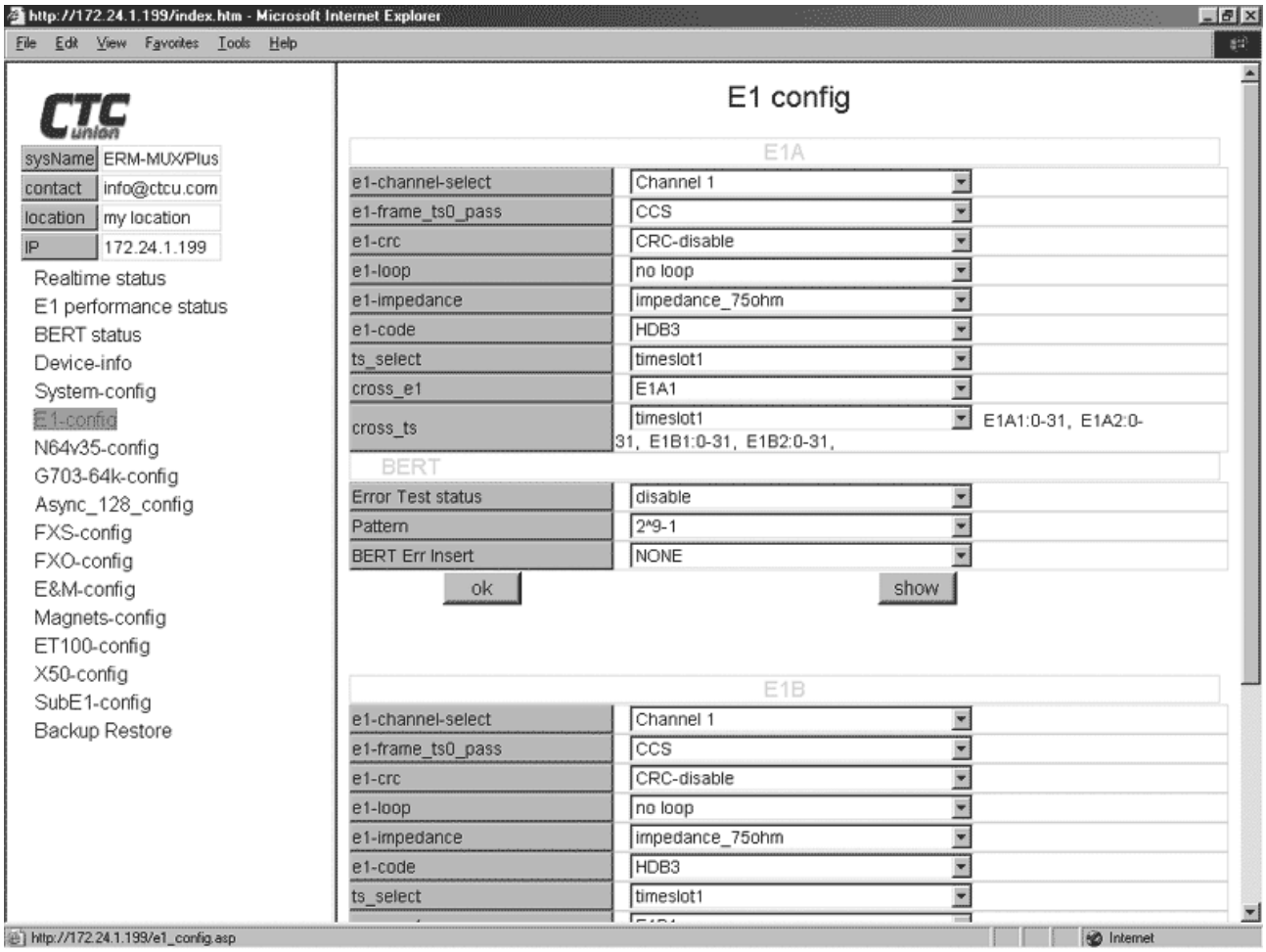
2. The ERM-MUX/Plus main chassis accommodates up to 2 CPU cards, CPU-A and CPU-B. When 2 cards are installed, the card that is working is referred to as 'Working', while the active standby CPU is referred to as 'Active'.

3. Two E1 cards may be installed in the main chassis, referred to as E1A and E1B. Each E1 card has two separate E1 channels, Ch1 and Ch2. All 4 E1s are referred to as E1A1, E1A2, E1B1 and E1B2.

4. There are 10 I/O slots available for I/O (Input/Output) line cards. They may be placed into any slot randomly. The available slots are referred to as IO-slot-1 to IO-slot-10, from left to right.

5. The expansion chassis provides an additional 10 slots for I/O cards. The available expansion slots are referred to as ext-IO-slot-1 to ext-IO-slot-10, from left to right.

Click **E1-config** to display and set the E1 configuration.

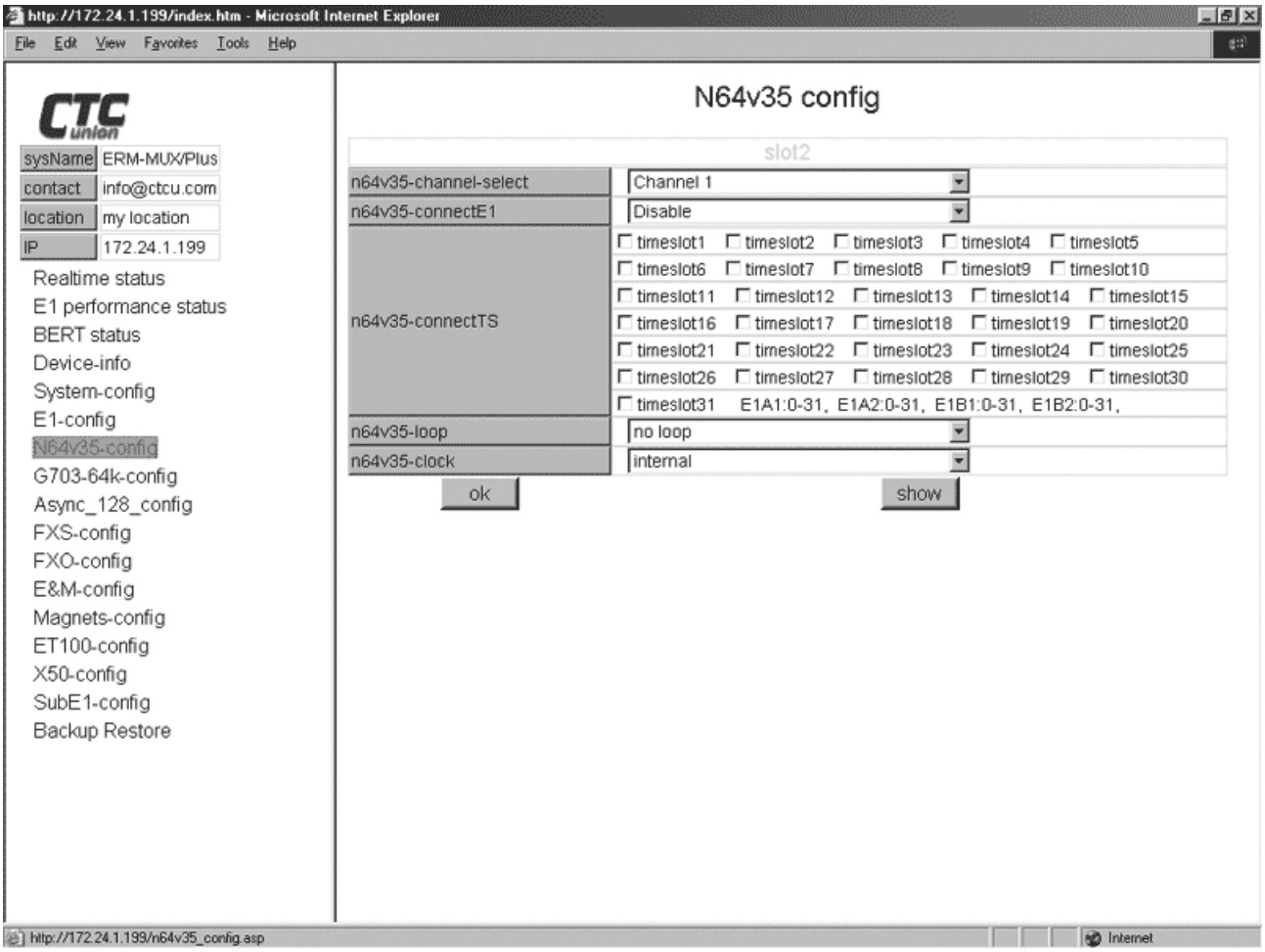


Please note the following:
1. The E1A is the left hand E1 card, while E1B is the right hand card. Each E1 card can select one of two channels for individual setting at a time. After setting the frame mode, crc, impedance, and line code click 'OK'. Select the next channel from the **e1-channel-select** pull-down.

2. When the **cross_e1** is set to its own channel (for example, when E1A1 channel has its **cross_e1** set to E1A1), no timeslot cross-connect function is active. To activate timeslot cross connect, select the destination from the **cross_e1** pull-down and the timeslot from the **cross_ts** pull-down.

3. To enable the integral BERT pattern generator on the specific E1 channel, enable the Error Test status, select the BERT pattern from the pull-down menu, select the inert error rate and click 'OK'.

Click **N64v35-config** to display and set the n x 64 sync I/O card configuration.

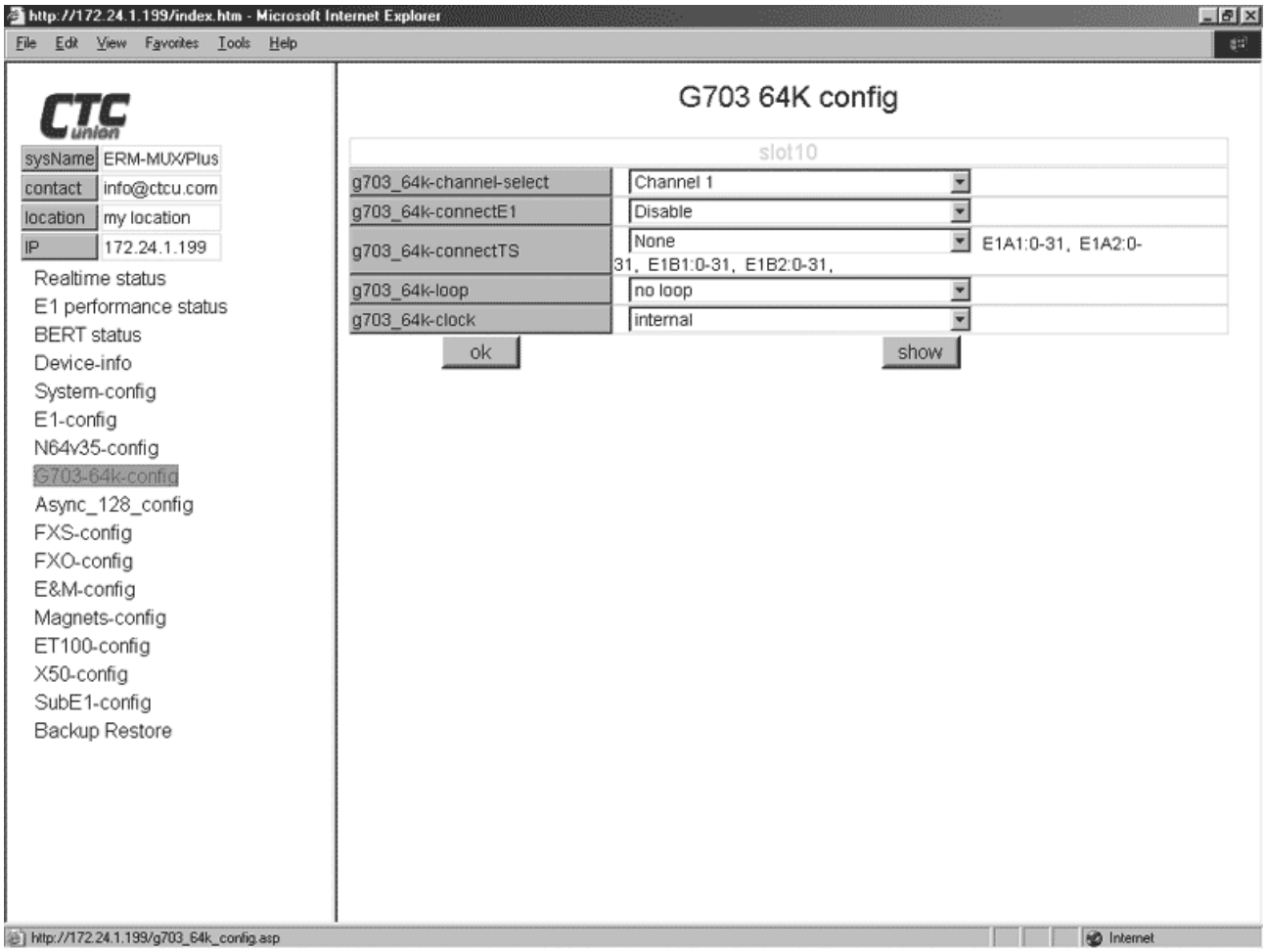


Please note the following:
1. The n64 I/O card has 4 high-speed synchronous channels. When assigning the E1 channel to the card channels, you may use any E1 channel source. The available timeslots for each E1 channel are shown in the format 'E1A1:0-31, E1A2:0-31, etc.).

2. In almost every case, the n64v35-clock will be set to internal. A setting of external is only possible if the I/O card will be the system clock source for the E1. (See system-config.)

3. Click 'OK' to save any channel changes. Select the channel and click 'Show' to display the current channel settings.

Click **G703-64-config** to display and set the n x 64 sync I/O card configuration.

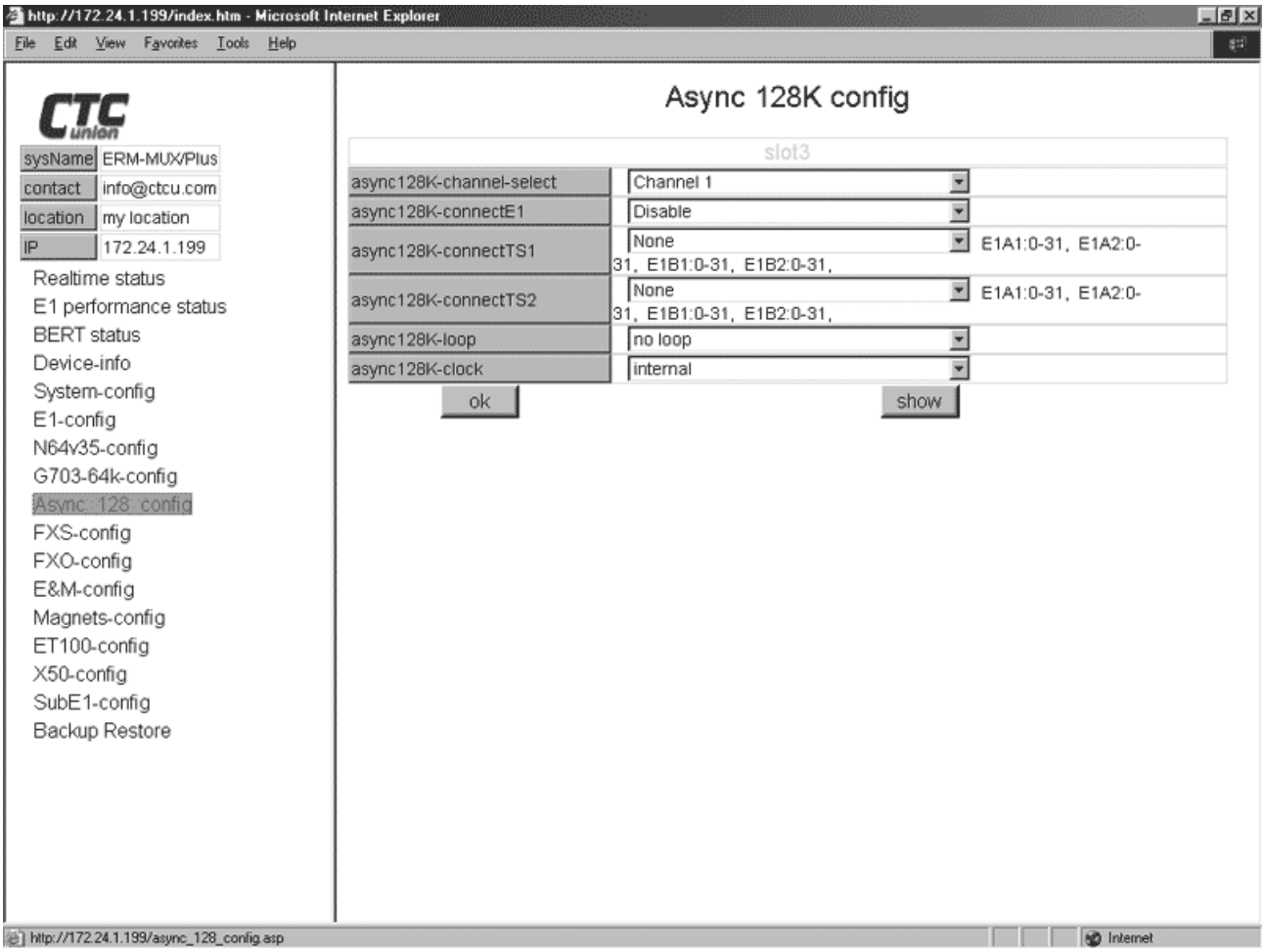


Please note the following:
1. The g703-64 codirectional I/O card has 6 64kbps synchronous channels. When assigning the E1 channel to the card channels, you may use any E1 channel source. The available timeslots for each E1 channel are shown in the format 'E1A1:0-31, E1A2:0-31, etc.).

2. In almost every case, the g703_64-clock will be set to internal. A setting of external is only possible if the I/O card will be the system clock source for the E1. (See system-config.)

3. Click 'OK' to save any channel changes. Select the channel and click 'Show' to display the current channel settings.

Click **Async_128_config** to display and set the Async I/O card configuration.



Please note the following:
1. The Async IO card has 6 RS-232 channels.

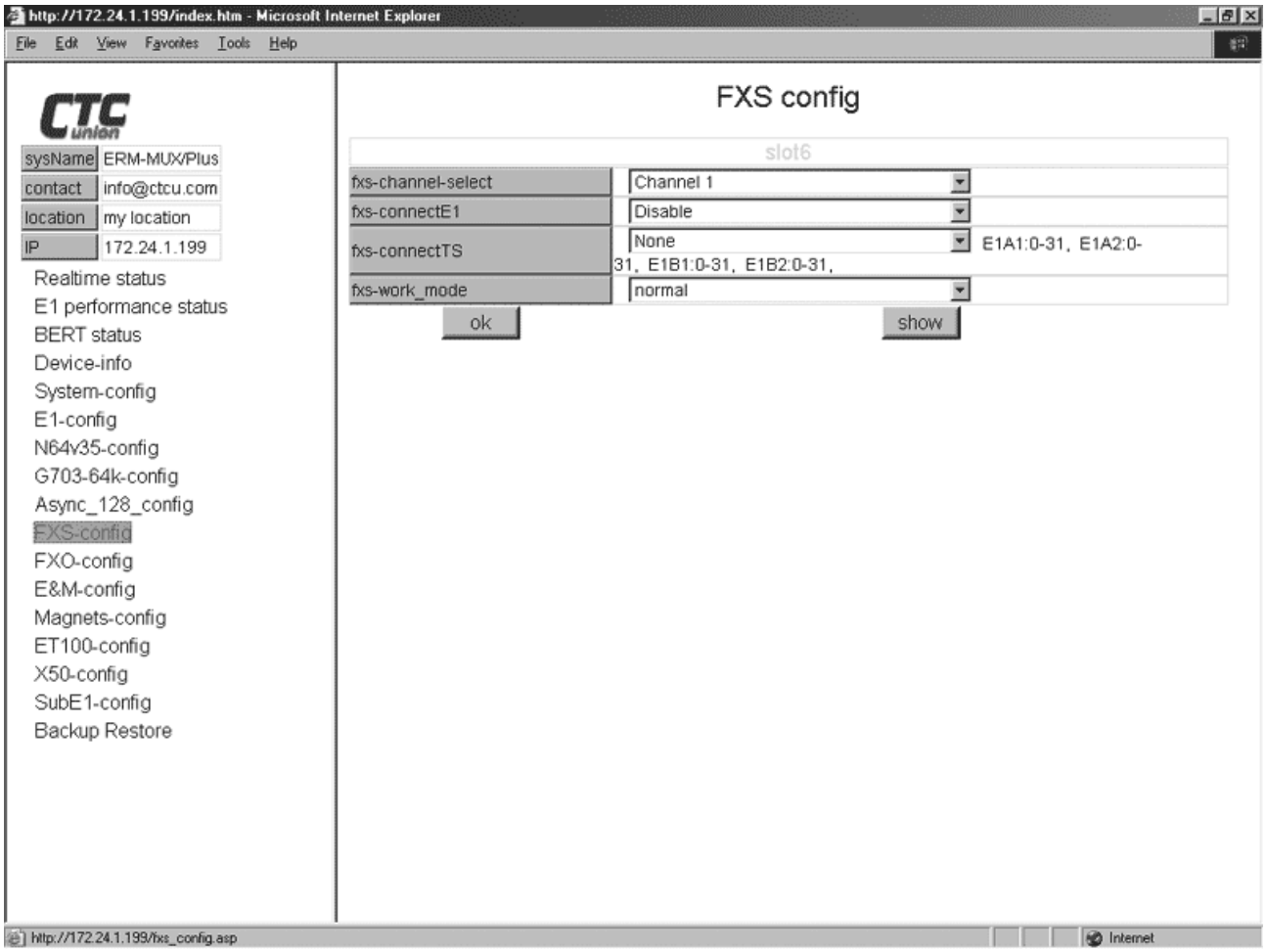
2. Each channel may connect to a different E1 channel.

3. Each async channel requires 2 timeslots to carry 128K. The timeslots do not have to be contiguous, but must be on the same E1 channel.

4. In almost every case, the async128k-clock will be set to internal. A setting of external is only possible if the I/O card will be the system clock source for the E1. (See system-config.)

5. Click 'OK' to save any channel changes. Select the channel and click 'Show' to display the current channel settings.

Click **FXS-config** to display and set the FXS voice I/O card configuration.



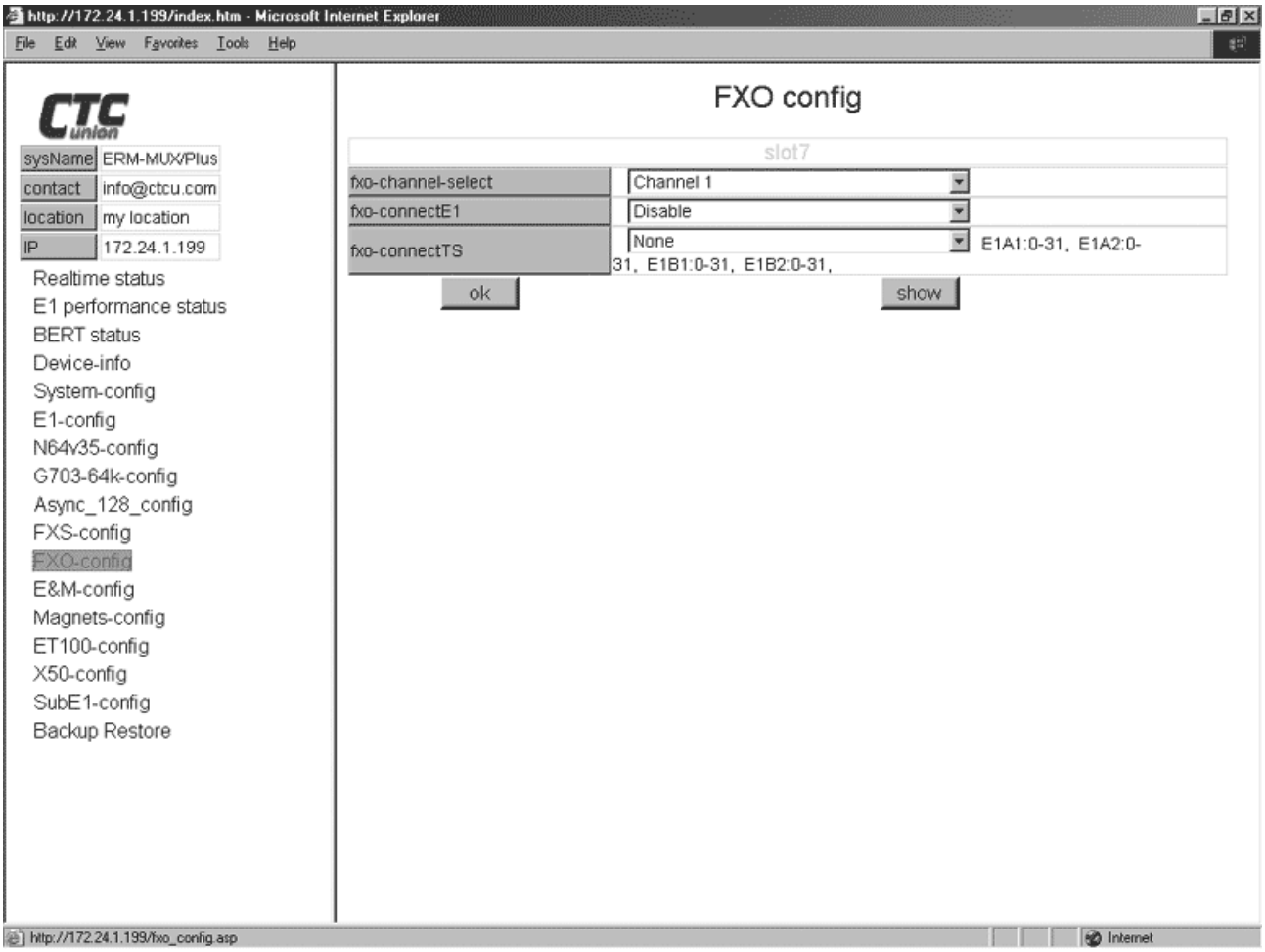
Please note the following:
1. The FXS IO card has 6 channels for voice.

2. Each channel may connect to a different E1 channel.

3. Only 1 timeslot is required for each voice channel.

4. Set the work mode as 'hotline' if the connected phoneline does not terminate at a PBX on the other end (ie. direct phone-to-phone connections).

Click **FXO-config** to display and set the FXO voice I/O card configuration.

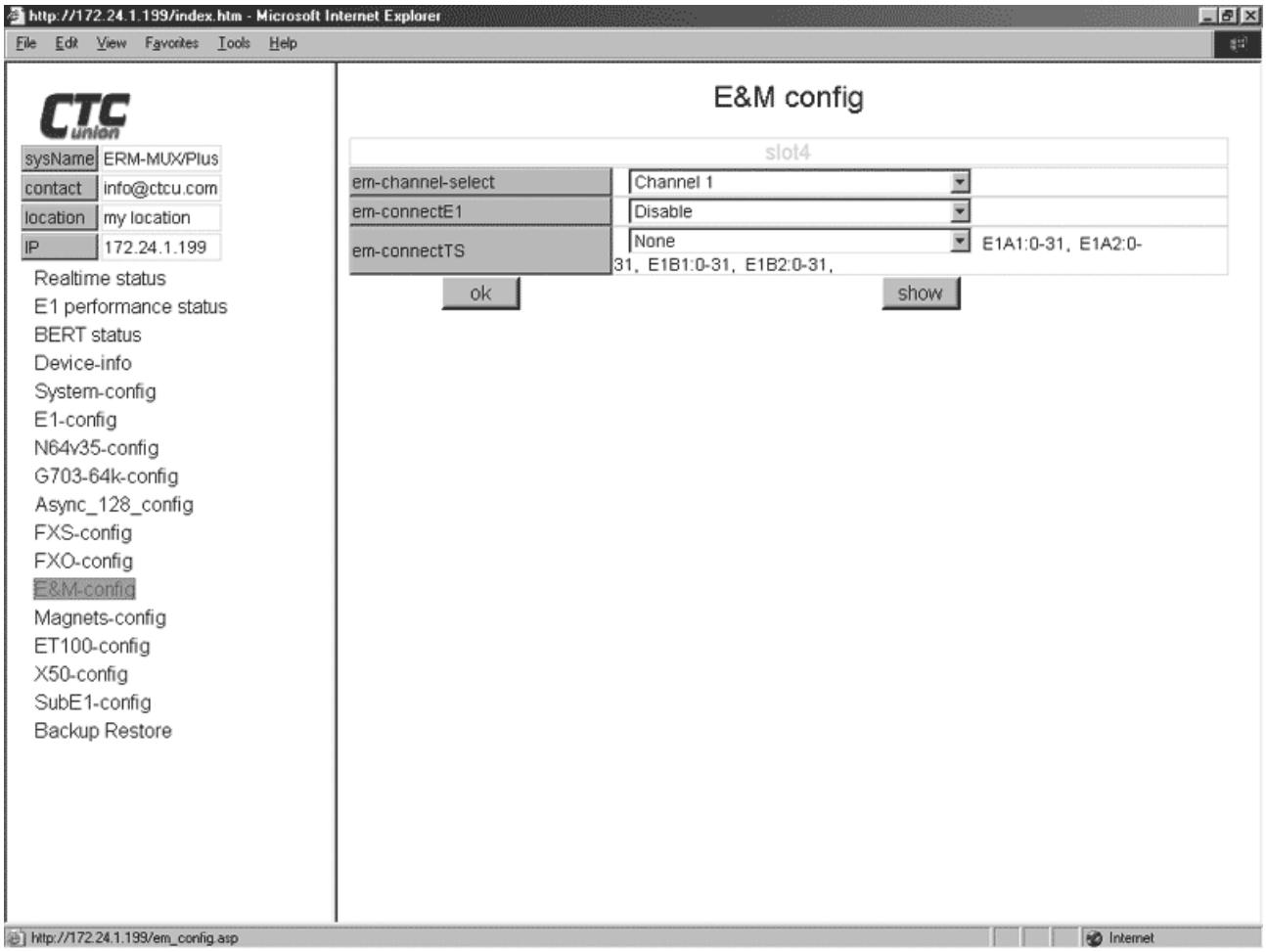


Please note the following:
1. The FXO IO card has 6 channels for voice.

2. Each channel may connect to a different E1 channel.

3. Only 1 timeslot is required for each voice channel.

Click **E&M-config** to display and set the E&M voice I/O card configuration.



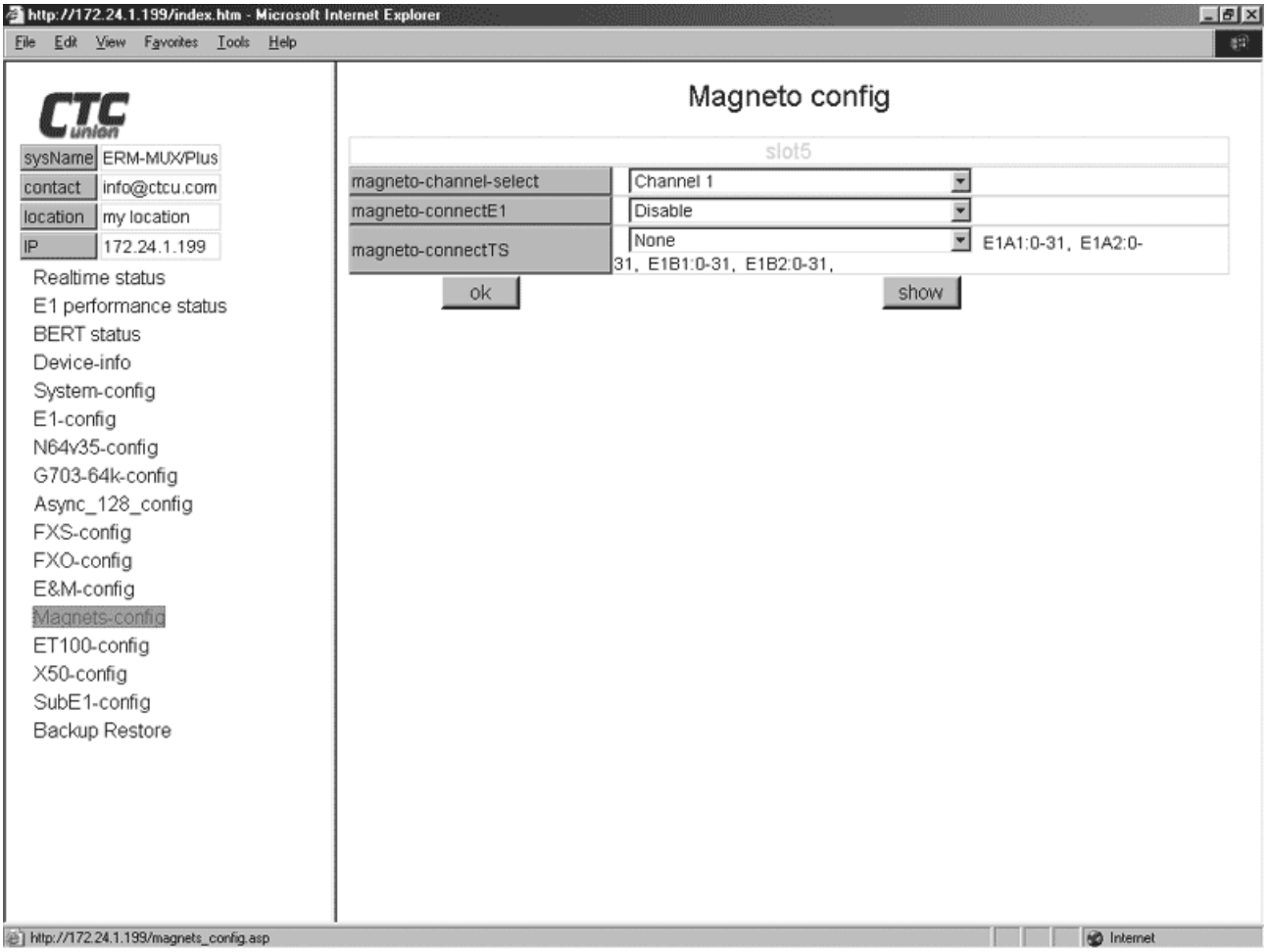
Please note the following:
1. The E&M IO card has 6 channels for voice.

2. Each channel may connect to a different E1 channel.

3. Only 1 timeslot is required for each voice channel.

4. The E&M IO card has identical configuration as that of the FXO IO card.

Click **Magneto-config** to display and set the Magneto voice I/O card configuration.



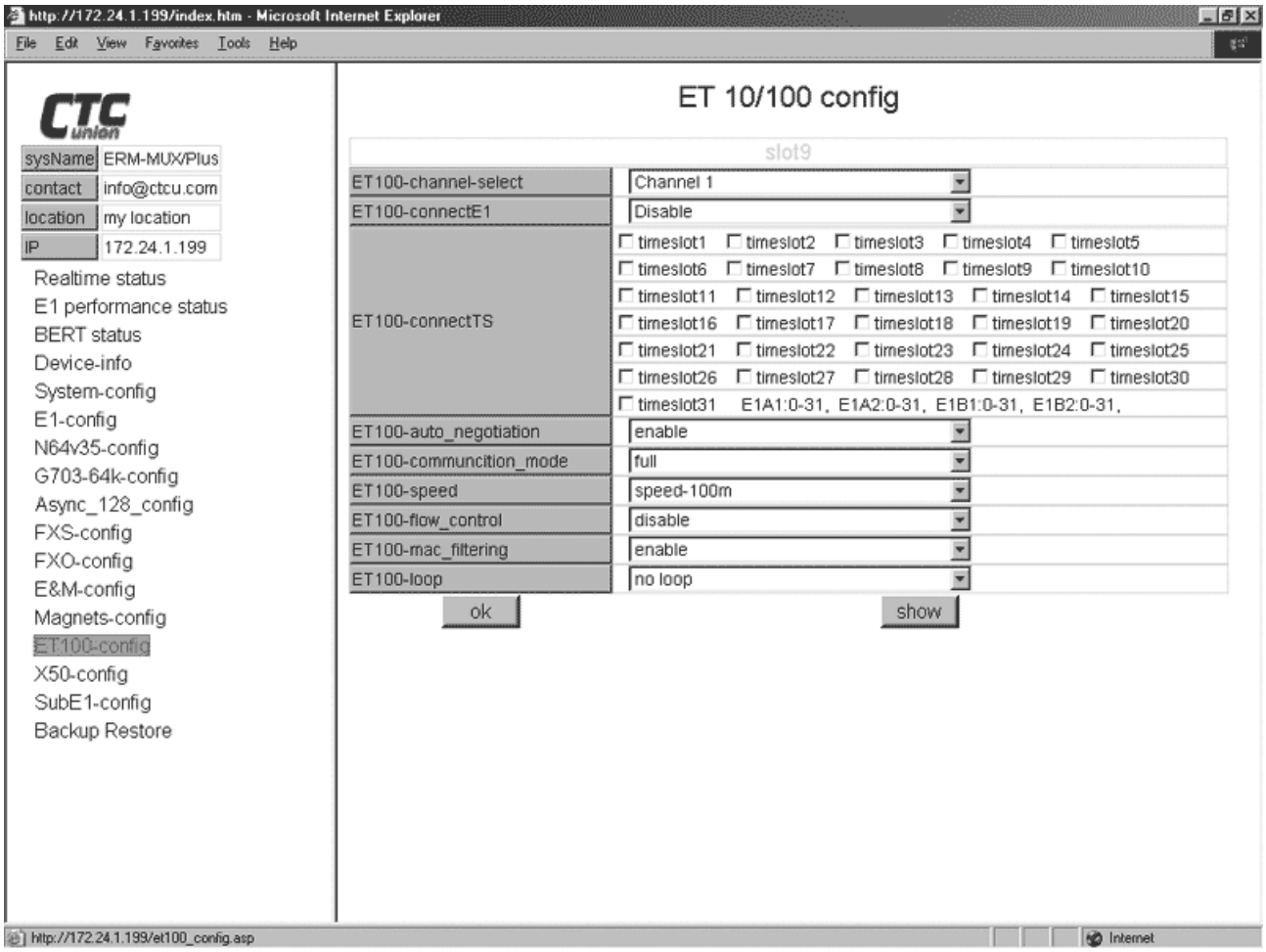
Please note the following:
1. The Magneto voice IO card has 6 channels for voice.

2. Each channel may connect to a different E1 channel.

3. Only 1 timeslot is required for each voice channel.

4. The Magneto voice IO card has identical configuration as that of the FXO IO card.

Click **ET100-config** to display and set the ET100 bridge I/O card configuration.



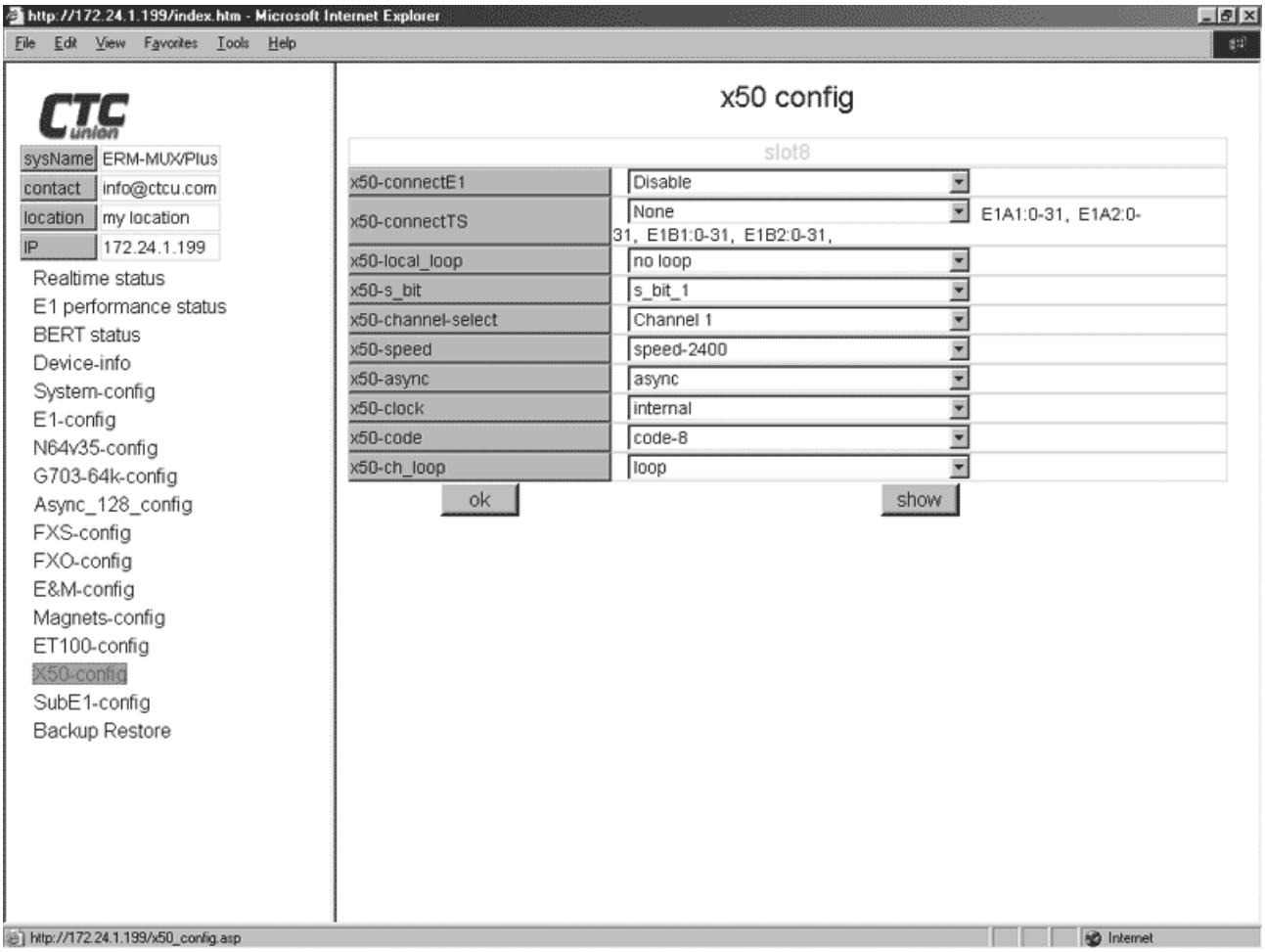
Please note the following:
1. The ET100 I/O card has 2 high-speed synchronous channels with standard HDLC protocol WAN bridges. When assigning the E1 channel to the card channels, you may use any E1 channel source. The available timeslots for each E1 channel are shown in the format 'E1A1:0-31, E1A2:0-31, etc.).

2. When auto-negotiation is enabled, the Ethernet will link at the appropriate speed and duplex automatically. When auto-negotiation is disabled, the communication mode and speed must be set to match the connected Ethernet equipment.

3. When MAC filtering is enabled, the ET100 acts as a true MAC filtering bridge. When disabled, the ET100 becomes an Ethernet repeater only. When connecting to a layer 2 switch, repeater mode is recommended.

4. Click 'OK' to save any channel changes. Select the channel and click 'Show' to display the current channel settings.

Click **X50-config** to display and set the X.50 I/O card configuration.



Please note the following:
1. The X50 IO card has 6 RS-232 channels.

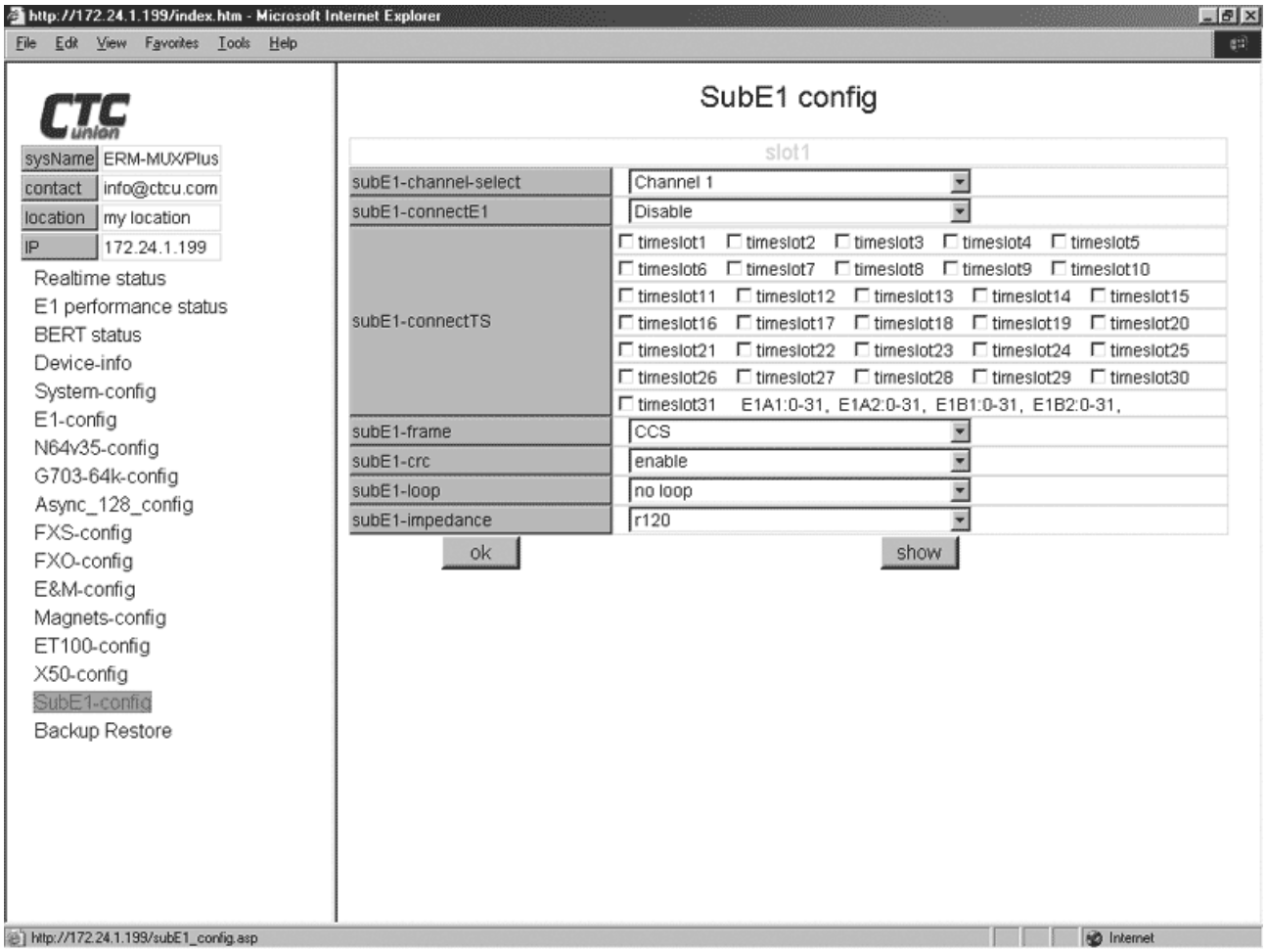
2. The card only requires one timeslot assignment (64K) from any one of the different E1 channels.

3. If more than 9600bps is assigned to a channel, less than the full 6 channels will be able to be used.

4. In almost every case, the X50-clock will be set to internal. A setting of external is only possible if the I/O card will be the system clock source for the E1. (See system-config.)

5. Click 'OK' to save any channel changes. Select the channel and click 'Show' to display the current channel settings.

Click **SubE1-config** to display and set the sub E1 I/O card configuration.

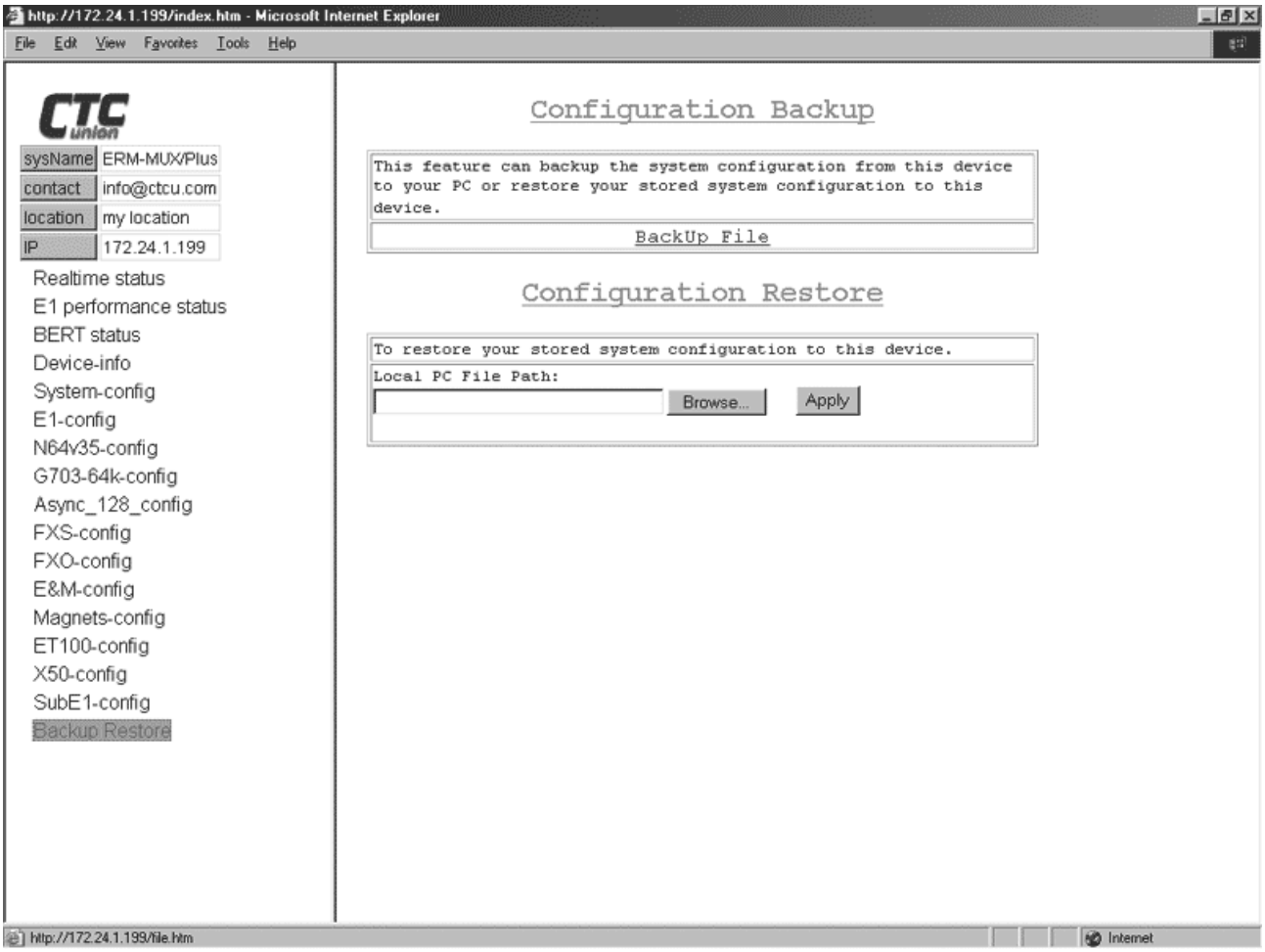


Please note the following:
1. Each sub E1 card can select one of two channels for individual setting at a time. After setting the frame mode, crc, impedance, and line code click 'OK'. Select the next channel from the **subE1-channel-select** pull-down.

2. Assign as many of the timeslots as required by clicking the check box for the relevant timeslot.

3. Click 'OK' to save any channel changes. Select the sub E1 channel and click 'Show' to display the current channel settings.

Click **Backup Restore** to enter the backup to PC or restore from PC utility.



Please note the following:
1. This utility will save all of the configuration data for the E1 and IO cards into one file that can be downloaded to the connected PC. Click the link labeled 'BackUp File'

2. The default filename is ***config.dat***, but may be renamed while saving.

3. To restore a configuration, click 'Browse' and locate the previously stored file and apply. Please wait patiently while the configuration is restored. Do not interrupt the process until Flash has completed writing.

4. The configuration may not work if the hardware has changed.

This completes this section on the Web Browser Management feature.

Breakdown of ERM-MUX/Plus MIB leaf objects.

Child	Sub-Child	leaf object	RW/RO	Set Parameters
		device_address	RW	Device Address:Format:" addr 1 . addr 2 . addr 3 . level" Example : 2.0.0.16
		power-a	RO	1: normal(0) 2: alarm(1) 3: empty(2)
		power-b	RO	1: normal(0) 2: alarm(1) 3: empty(2)
		power-c	RO	1: normal(0) 2: alarm(1) 3: empty(2)
		power-d	RO	1: normal(0) 2: alarm(1) 3: empty(2)
		cpu-a	RO	CPU-A Status
		cpu-B	RO	CPU-B Status
		e1-slot1	RO	E1 Slot 1 Status
		e1-slot2	RO	E1 Slot 2 Status
		io-slot1	RO	I/O Slot 1 Status
		io-slot2	RO	I/O Slot 2 Status
		io-slot3	RO	I/O Slot 3 Status
		io-slot4	RO	I/O Slot 4 Status
		io-slot5	RO	I/O Slot 5 Status
		io-slot6	RO	I/O Slot 6 Status
		io-slot7	RO	I/O Slot 7 Status
		io-slot8	RO	I/O Slot 8 Status
		io-slot9	RO	I/O Slot 9 Status
		io-slot10	RO	I/O Slot 10 Status
		ext-io-slot1	RO	EXTEND I/O Slot 1 Status
		ext-io-slot2	RO	EXTEND I/O Slot 2 Status
		ext-io-slot3	RO	EXTEND I/O Slot 3 Status
		ext-io-slot4	RO	EXTEND I/O Slot 4 Status
		ext-io-slot5	RO	EXTEND I/O Slot 5 Status
		ext-io-slot6	RO	EXTEND I/O Slot 6 Status
		ext-io-slot7	RO	EXTEND I/O Slot 7 Status
		ext-io-slot8	RO	EXTEND I/O Slot 8 Status
		ext-io-slot9	RO	EXTEND I/O Slot 9 Status
		ext-io-slot10	RO	EXTEND I/O Slot 10 Status
system		clock	RW	1: e1a1_revert_clock(0) 2: e1a2_revert_clock(1) 3: int_osc(2) 4: io_clock(3) 5: external_clock(4)
system		e1_backup	RW	1: disable(0) 2: single_to_single-e1a1_to_e1a2(1) 3: single_to_single-e1b1_to_e1b2(2) 4: single_to_single-e1a1b1_to_e1a2b2(3) 5: single_to_single-e1a1_to_e1b1(4) 6: single_to_multi-e1b1_backup(5) 7: card_to_card(6)

system		IO_clock_slot	RW	1: disable(0) 2: IO_slot1(1) 3: IO_slot2(2) 4: IO_slot3(3) 5: IO_slot4(4) 6: IO_slot5(5) 7: IO_slot6(6) 8: IO_slot7(7) 9: IO_slot8(8) 10: IO_slot9(9) 11: IO_slot10(10)
e1-config		e1-slot-select	RW	1: slot-1(0) 2: slot-2(1)
e1-config		e1-channel-select	RW	1: channel-1(0) 2: channel-2(1)
e1-config		e1-frame_ts0_pass	RW	1: ccs(0) 2: cas(1) 3: ccs-ts0-pass(2) 4: cas_ts0-pass(3)
e1-config		e1-crc	RW	1: crc-enable(0) 2: crc-disable(1)
e1-config		e1-loop	RW	1: no_loop(0) 2: local-loop(1) 3: to-remote-loop(2)
e1-config		e1-impedance	RW	1: impedance_75ohm(0) 2: impedance_120ohm(1)
e1-config		e1-code	RW	1: hdb3(0) 2: ami(1)
e1-config		error-test-status	RW	1: disable(0) 2: enable(1)
e1-config		pattern	RW	1: p_2E9-1(0) 2: p_2E11-1(1) 3: p_2E15-1(2) 4: QRSS(3) 5: ALL-0(4) 6: ALL-1(5) 7: ALT(6) 8: p_3-IN-24(7) 9: p_1-IN-16(8) 10: p_1-IN-8(9) 11: p_1-IN-4(10)
e1-config		err-insert	RW	1: NONE(0) 2: p_1-BIT-insert(1) 3: I0E-1(2) 4: I0E-2(3) 5: I0E-3(4) 6: I0E-4(5) 7: I0E-5(6) 8: I0E-6(7) 9: I0E-7(8)

e1-config	e1-timeslot_cross	ts_select	RW	1: ts1(1) 2: ts2(2) 3: ts3(3) 4: ts4(4) 5: ts5(5) 6: ts6(6) 7: ts7(7) 8: ts8(8) 9: ts9(9) 10: ts10(10) 11: ts11(11) 12: ts12(12) 13: ts13(13) 14: ts14(14) 15: ts15(15) 16: ts16(16) 17: ts17(17) 18: ts18(18) 19: ts19(19) 20: ts20(20) 21: ts21(21) 22: ts22(22) 23: ts23(23) 24: ts24(24) 25: ts25(25) 26: ts26(26) 27: ts27(27) 28: ts28(28) 29: ts29(29) 30: ts30(30) 31: ts31(31)
e1-config	e1-timeslot_cross	cross-e1	RW	1: e1a1(0) 2: e1a2(1) 3: e1b1(2) 4: e1b2(3)
e1-config	e1-timeslot_cross	cross-ts	RW	1: ts1(1) 2: ts2(2) 3: ts3(3) 4: ts4(4) 5: ts5(5) 6: ts6(6) 7: ts7(7) 8: ts8(8) 9: ts9(9) 10: ts10(10) 11: ts11(11) 12: ts12(12) 13: ts13(13) 14: ts14(14) 15: ts15(15)

				16: ts16(16) 17: ts17(17) 18: ts18(18) 19: ts19(19) 20: ts20(20) 21: ts21(21) 22: ts22(22) 23: ts23(23) 24: ts24(24) 25: ts25(25) 26: ts26(26) 27: ts27(27) 28: ts28(28) 29: ts29(29) 30: ts30(30) 31: ts31(31)
e1-config	e1-timeslot_cross	e1-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
n64v35-config		n64v35-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
n64v35-config		n64v35-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4)
n64v35-config		n64v35-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
n64v35-config		n64v35-loop	RW	1: loop(0) 2: normal(1)
n64v35-config		n64v35-clock	RW	1: internal(0) 2: external(1)
n64v35-config		n64v35-TD-status	RW	1: MARK(0) 2: SPACE(1) 3: ALT(2)

n64v35-config		n64v35-RD-status	RW	1: MARK(0) 2: SPACE(1) 3: ALT(2)
n64v35-config		n64v35-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts1	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts2	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts3	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts4	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts5	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts6	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts7	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts8	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts9	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts10	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts11	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts12	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts13	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts14	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts15	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts16	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts17	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts18	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts19	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts20	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts21	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts22	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts23	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts24	RW	1: disable(0) 2: enable(1)

n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts25	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts26	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts27	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts28	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts29	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts30	RW	1: disable(0) 2: enable(1)
n64v35-config	n64v35-ConnectTs	n64v35-connectTs-ts31	RW	1: disable(0) 2: enable(1)
g703_64k-config		g703_64k-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
g703_64k-config		g703_64k-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4)
g703_64k-config		g703_64k-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)

g703_64k-config		g703_64k-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15) 17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
g703_64k-config		g703_64k-loop	RW	1: loop(0) 2: normal(1)
g703_64k-config		g703_64k-clock	RW	1: internal(0) 2: external(1)
g703_64k-config		g703_64k-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)

async_128-config		async_128-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
async_128-config		async_128-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5) 6: channel-6(6)
async_128-config		async_128-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
async_128-config		async_128-connectTS1	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15)

				17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
async_128-config		async_128-connectTS2		1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15)
				17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
async_128-config		async_128-loop	RW	1: no_loop(0) 2: loop(1)
async_128-config		async_128-clock	RW	1: internal(0) 2: external(1)
async_128-config		async_128-TD-status	RW	1: MARK(0) 2: SPACE(1) 3: ALT(2)

async_128-config		async_128-RD-status	RW	1: MARK(0) 2: SPACE(1) 3: ALT(2)
async_128-config		async_128-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
fxs-config		fxs-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
fxs-config		fxs-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5) 6: channel-6(6)
fxs-config		fxs-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
fxs-config		fxs-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15)

				17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
fxs-config		fxs-work_mode	RW	1: normal(0) 2: hotline(1)
fxs-config		fxs-Interface-status	RW	1: NORMAL(0) 2: Active(1) 3: ALRAM(2)
fxs-config		fxs-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
fxo-config		fxo-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
fxo-config		fxo-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5) 6: channel-6(6)
fxo-config		fxo-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)

fxo-config		fxo-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15) 17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
fxo-config		fxo-Interface-status	RW	1: NORMAL(0) 2: Active(1) 3: ALRAM(2)
fxo-config		fxo-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
em-config		em-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)

em-config		em-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5) 6: channel-6(6)
em-config		em-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
em-config		em-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15) 17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
em-config		em-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)

magneto-config		magneto-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
magneto-config		magneto-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5) 6: channel-6(6)
magneto-config		magneto-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
magneto-config		magneto-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15)

				17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
magneto-config		magneto-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
et100 - config		et100-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
et100 - config		et100-channel-select	RW	1: channel-1(1) 2: channel-2(2)
et100 - config		et100-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
et100 - config		et100-auto_negotiation	RW	1: enable(0) 2: disable(1)
et100 - config		et100-communication_mode	RW	1: full(0) 2: half(1)
et100 - config		et100-speed	RW	1: speed-100m(0) 2: speed-10m(1)
et100 - config		et100-flow_control	RW	1: disable(0) 2: enable(1)
et100 - config		et100-mac_filtering	RW	1: enable(0) 2: disable(1)
et100 - config		et100-loop	RW	1: no_loop(0) 2: loop(1)

et100 - config		et100-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts1	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts2	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts3	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts4	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts5	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts6	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts7	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts8	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts9	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts10	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts11	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts12	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts13	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts14	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts15	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts16	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts17	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts18	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts19	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts20	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts21	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts22	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts23	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts24	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts25	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts26	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts27	RW	1: disable(0) 2: enable(1)

et100 - config	et100-ConnectTs	et100-connectTs-ts28	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts29	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts30	RW	1: disable(0) 2: enable(1)
et100 - config	et100-ConnectTs	et100-connectTs-ts31	RW	1: disable(0) 2: enable(1)
x50-config		x50-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18) 19: ext-slot-9(19) 20: ext-slot-10(20)
x50-config		x50-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
x50-config		x50-connectTS	RW	1: none(0) 2: ts1(1) 3: ts2(2) 4: ts3(3) 5: ts4(4) 6: ts5(5) 7: ts6(6) 8: ts7(7) 9: ts8(8) 10: ts9(9) 11: ts10(10) 12: ts11(11) 13: ts12(12) 14: ts13(13) 15: ts14(14) 16: ts15(15)

				17: ts16(16) 18: ts17(17) 19: ts18(18) 20: ts19(19) 21: ts20(20) 22: ts21(21) 23: ts22(22) 24: ts23(23) 25: ts24(24) 26: ts25(25) 27: ts26(26) 28: ts27(27) 29: ts28(28) 30: ts29(29) 31: ts30(30) 32: ts31(31)
x50-config		x50-local_loop	RW	1: no_loop(0) 2: loop(1)
x50-config		x50-s_bit	RW	1: s_bit_0(0) 2: s_bit_1(1)
x50-config		x50-channel-select	RW	1: channel-1(1) 2: channel-2(2) 3: channel-3(3) 4: channel-4(4) 5: channel-5(5)
x50-config		x50-speed	RW	1: speed-2400(0) 2: speed-4800(1) 3: speed-9600(2) 4: speed-19200(3)
x50-config		x50-async	RW	1: async(0) 2: sync(1)
x50-config		x50-clock	RW	1: internal(0) 2: external(1)
x50-config		x50-code	RW	1: code-8(0) 2: code-9(1) 3: code-10(2) 4: code-11(3)
x50-config		x50-ch_loop	RW	1: no_loop(0) 2: loop(1)
x50-config		x50-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
subE1-config		subE1-slot-select	RW	1: slot-1(1) 2: slot-2(2) 3: slot-3(3) 4: slot-4(4) 5: slot-5(5) 6: slot-6(6) 7: slot-7(7) 8: slot-8(8) 9: slot-9(9) 10: slot-10(10) 11: ext-slot-1(11) 12: ext-slot-2(12) 13: ext-slot-3(13) 14: ext-slot-4(14) 15: ext-slot-5(15) 16: ext-slot-6(16) 17: ext-slot-7(17) 18: ext-slot-8(18)

				19: ext-slot-9(19) 20: ext-slot-10(20)
subE1-config		subE1-channel-select	RW	1: channel-1(1) 2: channel-2(2)
subE1-config		subE1-connectE1	RW	1: disable(0) 2: e1a1(1) 3: e1a2(2) 4: e1b1(3) 5: e1b2(4)
subE1-config		subE1-frame	RW	1: ccs(0) 2: cas(1) 3: ccs-ts0_bypass(2)
subE1-config		subE1-crc	RW	1: enable(0) 2: disable(1)
subE1-config		subE1-loop	RW	1: no_loop(0) 2: loop(1) 3: to_remote_loop(2)
subE1-config		subE1-impedance	RW	1: r75(0) 2: r120(1)
subE1-config		subE1-LineStatus	RO	Line Status
subE1-config		subE1-configure-or-get_status	RW	1: get_status(0) 2: configure_timeslot_cross(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts1	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts2	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts3	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts4	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts5	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts6	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts7	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts8	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts9	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts10	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts11	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts12	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts13	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts14	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts15	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts16	RW	1: disable(0) 2: enable(1)

subE1-config	subE1-ConnectTs	subE1-connectTs-ts17	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts18	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts19	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts20	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts21	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts22	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts23	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts24	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts25	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts26	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts27	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts28	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts29	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts30	RW	1: disable(0) 2: enable(1)
subE1-config	subE1-ConnectTs	subE1-connectTs-ts31	RW	1: disable(0) 2: enable(1)
e1-performance-E1A1		e1-performance-E1A1-Err-Cnt	RO	
e1-performance-E1A1		e1-performance-E1A1-Err-Rate	RO	
e1-performance-E1A1		e1-performance-E1A1-BPV-Cnt	RO	
e1-performance-E1A1		e1-performance-E1A1-CRC-Cnt	RO	
e1-performance-E1A1		e1-performance-E1A1-CURR-ES	RO	
e1-performance-E1A1		e1-performance-E1A1-CURR-UAS	RO	
e1-performance-E1A1		e1-performance-E1A1-CURR-SEC	RO	
e1-performance-E1A1		e1-performance-E1A1-LONG-ES	RO	
e1-performance-E1A1		e1-performance-E1A1-LONG-UAS	RO	
e1-performanc		e1-performance-E1A1-LONG-SEC	RO	

e-E1A1				
e1-performance-E1A1		e1-performance-E1A1-counter	RO	
e1-performance-E1A1		e1-performance-E1A1-ES	RO	
e1-performance-E1A1		e1-performance-E1A1-UAS	RO	
e1-performance-E1A1		e1-performance-E1A1-history-index	RW	1: record1(1) 2: record2(2) 3: record3(3) 4: record4(4) 5: record5(5) 6: record6(6) 7: record7(7) 8: record8(8) 9: record9(9) 10: record0(10) 11: record11(11) 12: record12(12) 13: record13(13) 14: record14(14) 15: record15(15)
e1-performance-E1A1		e1-performance-E1A1-history-index	RW	16: record6(16) 17: record7(17) 18: record8(18) 19: record9(19) 20: record20(20) 21: record21(21) 22: record22(22) 23: record23(23) 24: record24(24) 25: record25(25) 26: record26(26) 27: record27(27) 28: record28(28) 29: record29(29) 30: record30(30)
e1-performance-E1A1		e1-performance-E1A1-history-index	RW	31: record31(31) 32: record32(32) 33: record33(33) 34: record34(34) 35: record35(35) 36: record36(36) 37: record37(37) 38: record38(38) 39: record39(39) 40: record40(40) 41: record41(41) 42: record42(42) 43: record43(43) 44: record44(44) 45: record45(45)

e1-performance-E1A1		e1-performance-E1A1-history-index	RW	46: record46(46) 47: record47(17) 48: record48(48) 49: record49(49) 50: record50(50) 51: record51(51) 52: record52(52) 53: record53(53) 54: record54(54) 55: record55(55) 56: record56(56) 57: record57(57) 58: record58(58) 59: record59(59) 60: record60(60)
e1-performance-E1A1		e1-performance-E1A1-history-index	RW	61: record61(61) 62: record62(62) 63: record63(63) 64: record64(64) 65: record65(65) 66: record66(66) 67: record67(67) 68: record68(68) 69: record69(69) 70: record70(70) 71: record71(71) 72: record72(72) 73: record73(73) 74: record74(74) 75: record75(75)
e1-performance-E1A1		e1-performance-E1A1-history-index	RW	76: record76(76) 77: record77(77) 78: record78(78) 79: record79(79) 80: record80(80) 81: record81(81) 82: record82(82) 83: record83(83) 84: record84(84) 85: record85(85) 86: record86(86) 87: record87(87) 88: record88(88) 89: record89(89) 90: record90(90) 91: record91(91) 92: record92(92) 93: record93(93) 94: record94(94) 95: record95(95) 96: record96(96)
e1-performance-E1A1		e1-performance-E1A1-history-ES	RO	
e1-performance-E1A1		e1-performance-E1A1-history-UAS	RO	
e1-performanc		e1-performance-E1A1-Reset	RW	1: normal(0) 2: clear(1)

e-E1A1				
e1-performance-E1A2		e1-performance-E1A2-Err-Cnt	RO	
e1-performance-E1A2		e1-performance-E1A2-Err-Rate	RO	
e1-performance-E1A2		e1-performance-E1A2-BPV-Cnt	RO	
e1-performance-E1A2		e1-performance-E1A2-CRC-Cnt	RO	
e1-performance-E1A2		e1-performance-E1A2-CURR-ES	RO	
e1-performance-E1A2		e1-performance-E1A2-CURR-UAS	RO	
e1-performance-E1A2		e1-performance-E1A2-CURR-SEC	RO	
e1-performance-E1A2		e1-performance-E1A2-LONG-ES	RO	
e1-performance-E1A2		e1-performance-E1A2-LONG-UAS	RO	
e1-performance-E1A2		e1-performance-E1A2-LONG-SEC	RO	
e1-performance-E1A2		e1-performance-E1A2-counter	RO	
e1-performance-E1A2		e1-performance-E1A2-ES	RO	
e1-performance-E1A2		e1-performance-E1A2-UAS	RO	
e1-performance-E1A2		e1-performance-E1A2-history-index	RW	1: record1(1) 2: record2(2) 3: record3(3) 4: record4(4) 5: record5(5) 6: record6(6) 7: record7(7) 8: record8(8) 9: record9(9) 10: record0(10) 11: record11(11) 12: record12(12) 13: record13(13) 14: record14(14) 15: record15(15)

e1-performance-E1A2		e1-performance-E1A2-history-index	RW	16: record6(16) 17: record7(17) 18: record8(18) 19: record9(19) 20: record20(20) 21: record21(21) 22: record22(22) 23: record23(23) 24: record24(24) 25: record25(25) 26: record26(26) 27: record27(27) 28: record28(28) 29: record29(29) 30: record30(30)
e1-performance-E1A2		e1-performance-E1A2-history-index	RW	31: record31(31) 32: record32(32) 33: record33(33) 34: record34(34) 35: record35(35) 36: record36(36) 37: record37(37) 38: record38(38) 39: record39(39) 40: record40(40) 41: record41(41) 42: record42(42) 43: record43(43) 44: record44(44) 45: record45(45)
e1-performance-E1A2		e1-performance-E1A2-history-index	RW	46: record46(46) 47: record47(17) 48: record48(48) 49: record49(49) 50: record50(50) 51: record51(51) 52: record52(52) 53: record53(53) 54: record54(54) 55: record55(55) 56: record56(56) 57: record57(57) 58: record58(58) 59: record59(59) 60: record60(60)

e1-performance-E1A2		e1-performance-E1A2-history-index	RW	61: record61(61) 62: record62(62) 63: record63(63) 64: record64(64) 65: record65(65) 66: record66(66) 67: record67(67) 68: record68(68) 69: record69(69) 70: record70(70) 71: record71(71) 72: record72(72) 73: record73(73) 74: record74(74) 75: record75(75)
e1-performance-E1A2		e1-performance-E1A2-history-index	RW	76: record76(76) 77: record77(77) 78: record78(78) 79: record79(79) 80: record80(80) 81: record81(81) 82: record82(82) 83: record83(83) 84: record84(84) 85: record85(85) 86: record86(86) 87: record87(87) 88: record88(88) 89: record89(89) 90: record90(90) 91: record91(91) 92: record92(92) 93: record93(93) 94: record94(94) 95: record95(95) 96: record96(96)
e1-performance-E1A2		e1-performance-E1A2-history-ES	RO	
e1-performance-E1A2		e1-performance-E1A2-history-UAS	RO	
e1-performance-E1A2		e1-performance-E1A2-Reset	RW	1: normal(0) 2: clear(1)
e1-performance-E1B1		e1-performance-E1B1-Err-Cnt	RO	
e1-performance-E1B1		e1-performance-E1B1-Err-Rate	RO	
e1-performance-E1B1		e1-performance-E1B1-BPV-Cnt	RO	
e1-performance-E1B1		e1-performance-E1B1-CRC-Cnt	RO	
e1-performance-E1B1		e1-performance-E1B1-CURR-ES	RO	

e1-performance-E1B1		e1-performance-E1B1-CURR-UAS	RO	
e1-performance-E1B1		e1-performance-E1B1-CURR-SEC	RO	
e1-performance-E1B1		e1-performance-E1B1-LONG-ES	RO	
e1-performance-E1B1		e1-performance-E1B1-LONG-UAS	RO	
e1-performance-E1B1		e1-performance-E1B1-LONG-SEC	RO	
e1-performance-E1B1		e1-performance-E1B1-counter	RO	
e1-performance-E1B1		e1-performance-E1B1-ES	RO	
e1-performance-E1B1		e1-performance-E1B1-UAS	RO	
e1-performance-E1B1		e1-performance-E1B1-history-index	RW	1: record1(1) 2: record2(2) 3: record3(3) 4: record4(4) 5: record5(5) 6: record6(6) 7: record7(7) 8: record8(8) 9: record9(9) 10: record0(10) 11: record11(11) 12: record12(12) 13: record13(13) 14: record14(14) 15: record15(15)
e1-performance-E1B1		e1-performance-E1B1-history-index	RW	16: record6(16) 17: record7(17) 18: record8(18) 19: record9(19) 20: record20(20) 21: record21(21) 22: record22(22) 23: record23(23) 24: record24(24) 25: record25(25) 26: record26(26) 27: record27(27) 28: record28(28) 29: record29(29) 30: record30(30)

e1-performance-E1B1		e1-performance-E1B1-history-index	RW	31: record31(31) 32: record32(32) 33: record33(33) 34: record34(34) 35: record35(35) 36: record36(36) 37: record37(37) 38: record38(38) 39: record39(39) 40: record40(40) 41: record41(41) 42: record42(42) 43: record43(43) 44: record44(44) 45: record45(45)
e1-performance-E1B1		e1-performance-E1B1-history-index	RW	46: record46(46) 47: record47(17) 48: record48(48) 49: record49(49) 50: record50(50) 51: record51(51) 52: record52(52) 53: record53(53) 54: record54(54) 55: record55(55) 56: record56(56) 57: record57(57) 58: record58(58) 59: record59(59) 60: record60(60)
e1-performance-E1B1		e1-performance-E1B1-history-index	RW	61: record61(61) 62: record62(62) 63: record63(63) 64: record64(64) 65: record65(65) 66: record66(66) 67: record67(67) 68: record68(68) 69: record69(69) 70: record70(70) 71: record71(71) 72: record72(72) 73: record73(73) 74: record74(74) 75: record75(75)

e1-performance-E1B1		e1-performance-E1B1-history-index	RW	76: record76(76) 77: record77(77) 78: record78(78) 79: record79(79) 80: record80(80) 81: record81(81) 82: record82(82) 83: record83(83) 84: record84(84) 85: record85(85) 86: record86(86) 87: record87(87) 88: record88(88) 89: record89(89) 90: record90(90) 91: record91(91) 92: record92(92) 93: record93(93) 94: record94(94) 95: record95(95) 96: record96(96)
e1-performance-E1B1		e1-performance-E1B1-history-ES	RO	
e1-performance-E1B1		e1-performance-E1B1-history-UAS	RO	
e1-performance-E1B1		e1-performance-E1B1-Reset	RW	1: normal(0) 2: clear(1)
e1-performance-E1B2		e1-performance-E1B2-Err-Cnt	RO	
e1-performance-E1B2		e1-performance-E1B2-Err-Rate	RO	
e1-performance-E1B2		e1-performance-E1B2-BPV-Cnt	RO	
e1-performance-E1B2		e1-performance-E1B2-CRC-Cnt	RO	
e1-performance-E1B2		e1-performance-E1B2-CURR-ES	RO	
e1-performance-E1B2		e1-performance-E1B2-CURR-UAS	RO	
e1-performance-E1B2		e1-performance-E1B2-CURR-SEC	RO	
e1-performance-E1B2		e1-performance-E1B2-LONG-ES	RO	
e1-performance-E1B2		e1-performance-E1B2-LONG-UAS	RO	
e1-performance-E1B2		e1-performance-E1B2-LONG-SEC	RO	

e1-performance-E1B2		e1-performance-E1B2-counter	RO	
e1-performance-E1B2		e1-performance-E1B2-ES	RO	
e1-performance-E1B2		e1-performance-E1B2-UAS	RO	
e1-performance-E1B2		e1-performance-E1B2-history-index	RW	1: record1(1) 2: record2(2) 3: record3(3) 4: record4(4) 5: record5(5) 6: record6(6) 7: record7(7) 8: record8(8) 9: record9(9) 10: record0(10) 11: record11(11) 12: record12(12) 13: record13(13) 14: record14(14) 15: record15(15)
e1-performance-E1B2		e1-performance-E1B2-history-index	RW	16: record6(16) 17: record7(17) 18: record8(18) 19: record9(19) 20: record20(20) 21: record21(21) 22: record22(22) 23: record23(23) 24: record24(24) 25: record25(25) 26: record26(26) 27: record27(27) 28: record28(28) 29: record29(29) 30: record30(30)
e1-performance-E1B2		e1-performance-E1B2-history-index	RW	31: record31(31) 32: record32(32) 33: record33(33) 34: record34(34) 35: record35(35) 36: record36(36) 37: record37(37) 38: record38(38) 39: record39(39) 40: record40(40) 41: record41(41) 42: record42(42) 43: record43(43) 44: record44(44) 45: record45(45)

e1-performance-E1B2		`	RW	46: record46(46) 47: record47(17) 48: record48(48) 49: record49(49) 50: record50(50) 51: record51(51) 52: record52(52) 53: record53(53) 54: record54(54) 55: record55(55) 56: record56(56) 57: record57(57) 58: record58(58) 59: record59(59) 60: record60(60)
e1-performance-E1B2		e1-performance-E1B2-history-index	RW	61: record61(61) 62: record62(62) 63: record63(63) 64: record64(64) 65: record65(65) 66: record66(66) 67: record67(67) 68: record68(68) 69: record69(69) 70: record70(70) 71: record71(71) 72: record72(72) 73: record73(73) 74: record74(74) 75: record75(75)
e1-performance-E1B2		e1-performance-E1B2-history-index	RW	76: record76(76) 77: record77(77) 78: record78(78) 79: record79(79) 80: record80(80) 81: record81(81) 82: record82(82) 83: record83(83) 84: record84(84) 85: record85(85) 86: record86(86) 87: record87(87) 88: record88(88) 89: record89(89) 90: record90(90) 91: record91(91) 92: record92(92) 93: record93(93) 94: record94(94) 95: record95(95) 96: record96(96)
e1-performance-E1B2		e1-performance-E1B2-history-ES	RO	
e1-performance-E1B2		e1-performance-E1B2-history-UAS	RO	
e-E1B2		e1-performance-E1B2-Reset	RW	1: normal(0) 2: clear(1)

Alarm messages for ERM-MUX/Plus SNMP

Alarm messages have the following format:
[Slot #] + [card type] + [channel] + [Alarm info] + [time] for example:
I/O Slot 8 FXS Plug_In Time 05.09.10.01.58.45

Slot	DEFAULT SYSTEM CPU-A CPU-B E1-A E1-B I/O SLOT1 … I/O SLOT10 EXPANSION I/O SLOT1 … EXPANSION I/O SLOT10
Card Type	DEFAULT SNMP FAN POWER CPU 2*E1 1*E1 N64K/V35 G703-64K FXS FXO E&M MGNTO X.50 N64K/232 ET100*2 A/SYNC-128K SUB E1 * 2 SYSTEM
Channel 1/2/3/4/5/6 E1A1/E1B1/E1A2/E1B2 Fan 1/2/3/4/5 Expansion Fan 1/2/3/4/5 Power A/B Expansion Power A/B	DEFAULT CHANNEL1/FAN1/E1A1/E1B1/PowerA CHANNEL2/FAN2/E1A2/E1B2/PowerB CHANNEL3/FAN3/Extend PowerA CHANNEL4/FAN4/Extend PowerB CHANNEL5/FAN5 CHANNEL6/Extend FAN1 CHANNEL7/Extend FAN2 CHANNEL8/Extend FAN3 CHANNEL9/Extend FAN4 CHANNEL10/Extend FAN5

Alarm Information	TURN ON TURN OFF NORMAL ALARM SYNC SYNC LOSS SIGNAL NORMAL SIGNAL LOSS REMOTE SYNC REMOTE SYNC LOSS STOP WORKING BACKUP WORKING PLUG IN PLUG OUT CHANGE CARD EXTERNAL CLOCK SIGNAL LOSS EXTERNAL CLOCK SIGNAL NORMAL AIS NORMAL AIS ALARM User login MARK SPACE ALT EMPTY ACTIVE(FXS/FXO voice call)
Alarm Date-Time	Yymmddhhmmss

Appendix A Specifications of ET100 card

When the ERM-MUX/PLUS uses the ET100 card, it is not only a multifunctional TD-intercrossing multiplexer, but also, a high performance 10/100M Ethernet Bridge over E1 LINK. The physical interface of ET100 is RJ-45 Ethernet. Each card provides two ports. The rate of WAN in each port ranges from 64Kbps~1984Kbps and can be selected according to user's needs when any E1 line of the device is linked. The rate of LAN is 10M/100M auto-negotiation, and user can set to link HUB or PC without changing the cable (MDIX).

Features
LAN
10/100Mbps full-duplex/half-duplex
Support IEEE802.3 flow control
Auto-MDI/MDIX detects and corrects crossed cable
256 MAC address with 5 minute automatic aging
Auto-address update
Up to 340 packages buffer
WAN
Support HDLC protocol.
Sending data follows external E1 clock.
Provide loop test function.
Rate is assigned according to user need.

Illustration of LED Indicators:

Name	Color	Descriptions
PWR	green	Light on-indicates Card power normal, off - Card power fault
Alarm	red	Light on-indicates Card alarm, off – normal
Link status	yellow	Light on-indicates linked, off - not linked
ERR	yellow	Light on-indicates some error event happened, off - normal
DP_STAT	green	Light on-indicates full-duplex, off - half-duplex
Speed	green	Light on-100M. off - 10M
WRXD	green	Light on-receive data from WAN, off- line is idle.
WTXD	green	Light on- transmit data from WAN, off- line is idle.

Interface and Cable
Ethernet LAN Interface on RJ-45 connecter
ET100 port provides Auto MDIX, using direct connect cable to PC or HUB.
RJ-45 Pins assignment: Pin 1,2 TD+ TD-, Pin 3,6 RD+ RD-.

Notice: When select MDI mode (SW1-1 at OFF state):
Cable connecting to PC must be direct cable, and cable to HUB must be crossed cable.

Configuration
Hardware setting
Auto-MDI/MDIX Setting

SW1-1	Description
ON	Auto-MDI/MDIX mode
OFF	MDI mode

Memory Settings

SW1-2	SW1-3	Description
ON	ON	LAN TO WAN 308 packages, WAN TO LAN 32 packages.
ON	OFF	LAN TO WAN 170 packages, WAN TO LAN 170 packages.
OFF	ON	LAN TO WAN 32 packages, WAN TO LAN 320 packages.
OFF	OFF	No defined.

SW1-4: No defined.
Parameters setting by Monitor menu or NMP Management

Auto-Negotiation.
Communication Speed: 10Mor100M

Flow Control.
Mac Filtering.
Communication Mode: Full/Half duplex.
Local Loop(only for manufacturer testing).

E1 channel selection.
E1 Time slots selection

ET100 Monitor menu setup
Set ET100 card
Selecting one ET100 card, it displays the current configuration and status information of the N64K/V35 card selected.
slot 04 ET100 card STATE:NORMAL
It shows the slot number, card type, and card status
CH1:NOE1:NULL,ANEG ENABLE,FULL,100M,FLOW CONTROL DISABLE,AUTO MAC ENABLE,NOLOOP
CH2:NOE1:NULL,ANE ENABLE,FULL,100M,FLOW CONTROL DISABLE,AUTO MAC ENABLE,NOLOOP
It shows the status of each channel, including multiplexed E1 channel, timeslot, ANEG or not, full/half duplex,10M/100M,flow control or not, auto MAC or not, loop mode.

ET100 Menu Display

```
<< I/O CONFIG-ET100 >>
     1. CH1          Set channel 1
     2. CH2          Set channel 2
     0. EXIT         Return to the input box of I/O card
                     configuration
INPUT SELECT:1
```

Press 0 or ESC to return to the I/O card selection menu, Press 1-2 to enter ET100 channel configuration (the same configuration menu applies for both channels, 1 and 2).

ET100 Channel Menu Display
Select a channel, say channel 1, and enter configuration menu, the menu displays:

```
<< IO CONFIG-ET100-CHANNEL 1 >>
```

1.CONNECT E1	Set multiplex E1 channel
2.CONNECT TIMESLOT	Set multiplex timeslot
3. Auto-Negotiation	Set ANEG
4. Communication Mode	Set Full/Half duplex
5. Speed	Set 10M/100M
6. Flow Control	Set Flow control
7. Mac Filtering	Set Auto MAC
8. Local Loop	Set Local Loop(only for manufacturer testing)
0.EXIT	Return to the upper menu

```
INPUT SELECT:
```

Press 0 or ESC to return to the upper menu, and press 1-8 to enter the corresponding configuration.

Set multiplex E1 number
Press 1 to enter the configuration menu of setting E1 channel. The menu displays:

```
<< IO CONFIG-ET100-CHANNEL 1-E1 >>
```

***1. DISABLE**	No multiplexing
2. E1A1	Multiplexing from E1A1
3. E1A2	Multiplexing from E1A2
4. E1B1	Multiplexing from E1B1
5. E1B2	Multiplexing from E1B2
0. EXIT	Return to the upper menu

```
INPUT SELECT:
```

('*'indicates the current setting.)

Press number 1 to 5 to configure and press 0 or ESC to return to the upper menu. After selecting a number, the menu will refresh, and '*' will indicate the new settings.

Set multiplex timeslot
Press 2 to configure multiplex timeslot, if users do not set any E1 channel connection, then the system displays:

```
PLEASE CHOOSE CONNECT E1 FIRST!
```

If any E1 channel connection has been set, say E1A1, then the system displays the idle timeslots of all E1 channels.

```
FREE TIMESLOT IS:
E1A1: 01-30,
E1A2: 01-31,
E1B1: 01-31,
E1B2: 01-31,
```

It also displays the current status that there is no timeslot connection from E1A1.

```
CURRENT:E1A1-NULL
INPUT EXAMPLE:  3-9,11
INPUT TIMESLOT:
```

One or more than one idle timeslots can be assigned to one channel:
You can assign one single timeslot number or consecutive timeslot numbers. For example, 5,10-20,27 means the timeslots 5, 10 to 20, and 27 of E1A1 (selected earlier) are assigned to CH1.
Input the idle timeslot number and press Enter to confirm. Return to the upper menu. If the input timeslot is being used then the system prompts:

```
THE TIMESLOT ALREADY USED!
INPUT AGAIN!
```

INPUT TIMESLOT

If no timeslot number has been input, then press Enter or ESC return to the upper menu.
Set Auto-Negotiation mode
Press 3 to set Auto-Negotiation mode, the menu displays

```
<< I/O CONFIG-ET100-CHANNEL 1-ANEG >>
*1. ENABLE                          Auto Enable
 2. DISABLE                         Auto Disable
 0. EXIT                            Return to the upper
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Set Work mode
Press 4 to set Work mode, the menu displays

```
<< I/O CONFIG-ET100-CHANNEL 1-DPLEX >>
*1. FULL                            Full duplex
 2. HALF                            Half duplex
 0. EXIT                            Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Set Speed
Press 5 to set Speed, the menu displays

```
<< I/O CONFIG-ET100-CHANNEL 1-SPEED >>
*1. 100M                            100BASE-TX
 2. 10M                             10BASE-T
 0. EXIT                            Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Set Flow Control mode
Press 6 to set Flow Control mode, the menu displays

```
<< I/O CONFIG-ET100-CHANNEL 1-FLOW CONTROL >>
*1. DISABLE                         Without Flow Control
 2. ENABLE                          With Flow Control
 0. EXIT                            Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Set Auto MAC mode (filtering)
Press 7 to set Auto MAC mode, the menu displays

```
<< I/O CONFIG-ET100-CHANNEL 1-AUTO MAC >>
*1. DISABLE                    Without Auto MAC
 2. ENABLE                     With Auto MAC
 0. EXIT                       Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Set loop mode
Press 8 to set loop mode, the menu displays

```
<< IO CONFIG- ET100-CHANNEL 1-LOOPBACK >>
*1. LOOP                       With loop
 2. NORMAL                     Without loop
 0. EXIT                       Return to the upper menu
INPUT SELECT:0
```

('*'indicates the current setting.)

Press 1 or 2 to select configuration, and press 0 or ESC to return to the upper menu. The system will refresh the display, and '*' will indicate the new setting.

Appendix B Specifications of Expansion Chassis

B-1 Introduction

If the ports on all the I/O cards are not enough, extension chassis can be used. It can extend IO card to 20 slots, voice channel can be extended up to 120.

There is no need to insert CPU or E1 cards in the expansion chassis, but power modules are required, and those external clock interface, SNMP input, two ends of RS-485 and major/ minor alarm contact points on its backplane cannot be used.

For the device management, system uses the main chassis and expansion chassis as one device and supports either terminal or NMP/SNMP management mode. MUX-PLUS main chassis can have only one expansion chassis.

The connection to expansion chassis

1. Connect main chassis to expansion chassis by HDB62 expansion chassis signal cable. Cable connector is on the backplane as following Fig B1 (cable pin assignment see section 4).
2. Confirm no CPU or E1 cards are in expansion chassis.
3. Power on without regard to sequence; however it is suggested to switch on the main chassis first.
4. Set the parameters for each port to start work of expansion chassis. (see section 3).

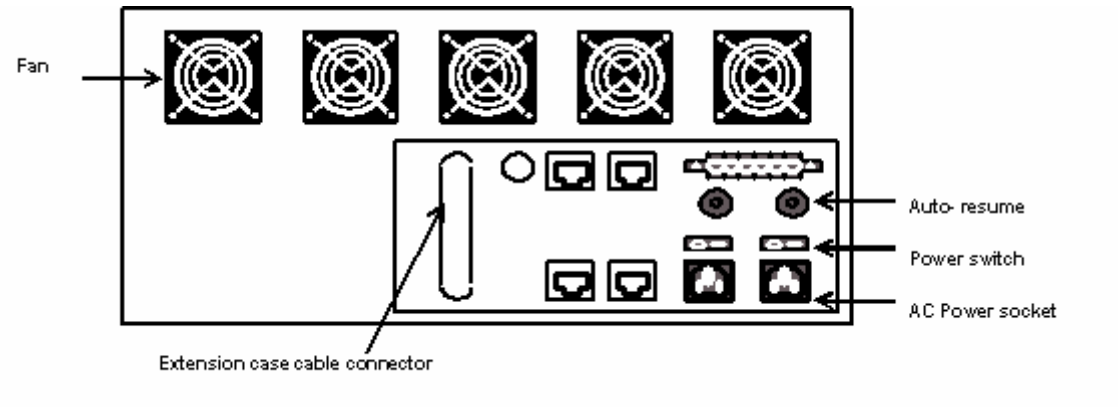


Fig B1 Connections on backplane

B-2 Settings for Extension Case by Terminal

After power on, system displays on screen

```
<< MAIN MENU >>
        1. E1  CONFIG
        2. I/O CONFIG
        3. DISPLAY CONFIG
        4. CONFIG
        5. SET DEFAULT
        6. SET SYSTEM
        0. EXIT
```

Select 2, displays:

```
INPUT SELECT:2
IO CONFIG
SEARCH.....
BOARD NO:1,4,5,6,7,8,9,10,17(E-1),19(E-3),20(E-4),21(E-5),23(E-7),26(E-10)
INPUT BOARD NO: 26
EXTEND slot 10  N64/V35      STAT:NORMAL
CH1:E1A1:1-30 ,DCE,INTERNAL CLOCK,NOLOOP
CH2:E1A2:1-31,DCE,INTERNAL CLOCK,NOLOOP
CH3:E1B1:1-31,DCE,INTERNAL CLOCK,NOLOOP
CH4:E1B2:1-31,DCE,INTERNAL CLOCK,NOLOOP
```

Next settings is as same as the main case.

Note: In the expansion chassis, the first slot displays 17(E-1), second slot, 18 (E-2), and so on up to 26 (E-10) which means the expansion chassis slot 10.

For example:

To set slot 1, enter 17.

To set slot 2, enter 18.

To set slot 3, enter 19.

In turn, enter 26 to set slot 10 in expansion chassis. The settings of other parameters are the same as with the main chassis.

DB62 Cable Pins and Definitions Table (male to male)

62 core pins allocations	62 core pins allocations	Definitions	
1	1	signal	single
2	2	signal	twisted-pair
3	3	(GND)	
4	4	signal	single
5	5	signal	twisted-pair
6	6	(GND)	
7	7	signal	twisted-pair
8	8	(GND)	
9	9	signal	twisted-pair
10	10	(GND)	
11	11	signal	twisted-pair
12	12	(GND)	
13	13	signal	twisted-pair
14	14	(GND)	
15	15	signal	single
16	16	(GND)	twisted-pair
17	17	signal	
18	18	signal	single
19	19	(GND)	twisted-pair
41	41	signal	
21	21	signal	single
22	22	signal	single
23	23	signal	twisted-pair
44	44	(GND)	
24	24	(GND)	twisted-pair
45	45	signal	
25	25	signal	twisted-pair
46	46	(GND)	
26	26	(GND)	twisted-pair
47	47	signal	
27	27	signal	twisted-pair
48	48	(GND)	
28	28	(GND)	twisted-pair
49	49	signal	
29	29	signal	twisted-pair
50	50	(GND)	
30	30	(GND)	twisted-pair
51	51	signal	
31	31	signal	twisted-pair
52	52	(GND)	
32	32	(GND)	twisted-pair
53	53	signal	
33	33	signal	twisted-pair
54	54	(GND)	
34	34	(GND)	twisted-pair
55	55	signal	
35	35	signal	twisted-pair
56	56	(GND)	
36	36	(GND)	twisted-pair
57	57	signal	
37	37	signal	twisted-pair
58	58	(GND)	
38	38	(GND)	twisted-pair
59	59	signal	
39	39	signal	twisted-pair
60	60	(GND)	
40	40	(GND)	twisted-pair
61	61	signal	
42	42	signal	single
43	43	signal	single
62	62	signal	single

Note 1:PIN20 has no connection.

Note 2:The length of cable should not be longer than 0.5m

Appendix C Specifications of NMP

Specifications of NMP Network Management Functional Extension and Multiple Chassis application

C-1 Connecting NMP network management access

The NMP network management system can connect via local PC or from cascaded equipment such as the ETU-DXC or other ERM-MUX/PLUS via E1 line. We refer to this as in-band network management mode. (See the Network Management Protocol System Operational User Manual.)

Note: Before using NMP network functions, the ERM-MUX/PLUS must be configured with console terminal to select the network management mode and other necessary settings. (See Chapter 5)

C-1.1 Local NMP network management

Connect the DB9 serial cable between the PC COM port and the CPU card's front panel NM Ctrl connecter.
Communication mode: RS-232 9600/8/N/1
RS-232 Pin assignment: 2-TXD, 3-RXD, 5-ground.
Using the RS-485 connecters (RJ-45x2) can extend management to multiple chassis.
Note: RJ-45 Pin assignment for RS-485: 1(+), 2(-) NMP RXD; 3(+), 4(-) NMP TXD; 7, 8 ground.
Multiple chassis RS485 links can only use from the top layer (parent) in the NMP network topology structure.

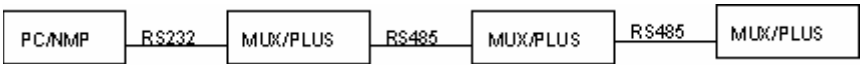


Fig 1

Notes:
1) When using double CPU cards, the CPU cards will work in Backup Mode automatically after power on, without any other settings.
2) Local control serial console cable should connect to working CPU's port.
3) After setting by the terminal menu, in-band management will connect from E1A1 line to child device (only requires one timeslot of E1 line) See fig 2.
Note: Only E1A1 line or its backup E1 line can connect with in-band NMP network management.

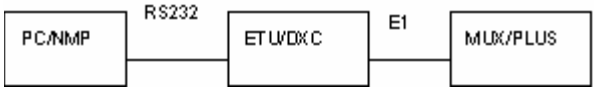


Fig 2

C-2. Adding MUX-PLUS Devices in NMP System

To add one MUX-PLUS device in NMP, configuration of the MUX-PLUS parameters in NMP system and local terminal is needed. Please refer to the NMP Operation Users Guide.

C-3.1 NMP Configuration

Terminal configuration (definition for device address and NMP parent/child ports)
Connect the DB9 serial cable between the PC COM port and CPU module front panel LOC Ctrl connecter.
Communication settings: RS-232 9600/8/N/1
Run HyperTerminal on the PC.
Power on the MUX-PLUS and enter the main menu for device management.
First select menu items 6->3->3 to clear any previous NMP parameters.
In the main menu, select items 6->3->5, input MUX-PLUS address. (See 5.7.3.4)

C-3.2 Modify NMP up port (connected to a parent device)

When local MUX-PLUS device connects with NMP system directly by RS-232 port on the front panel, in the main menu, select items 6-->3-->1-->1-->1 to define local NMP mode.
When MUX-PLUS device connects with NMP system by RS-485 port on the backplane, in main menu, select items 6-->3-->1-->2-->1-->5. UP-485.

When MUX-PLUS device connects with NMP by E1 cable (in-band NMP), in main menu, select items 6-->3-->1-->2-->1-->1/2/3/4 (corresponding to E1A1/E1A2/E1B1/E1B2), then enter the NMP timeslot.
Modify the NMP lower port (connected as a child device)

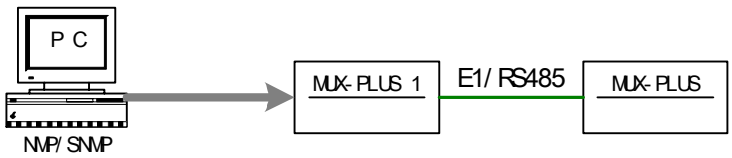
a. For the local device connected with NMP directly, in main menu, select items 6-->3-->1-->2-->1/2/3/4, (corresponding to E1A1/E1A2/E1B1/E1B2), enter the lower NMP timeslot. if there is no child device, enter 0 to clear the lower NMP timeslot.
b. For the device connected with NMP by other device, in main menu, select items 6-->3-->2-->2-->1/2/3/4 (corresponding to E1A1/E1A2/E1B1/E1B2), enter the lower NMP timeslot, if no child device, enter 0 to clear the lower NMP timeslot.
Return to main menu and save all parameters. The configuration is finished.

C-3.3 Definition for device addresses and the port connected to NMP

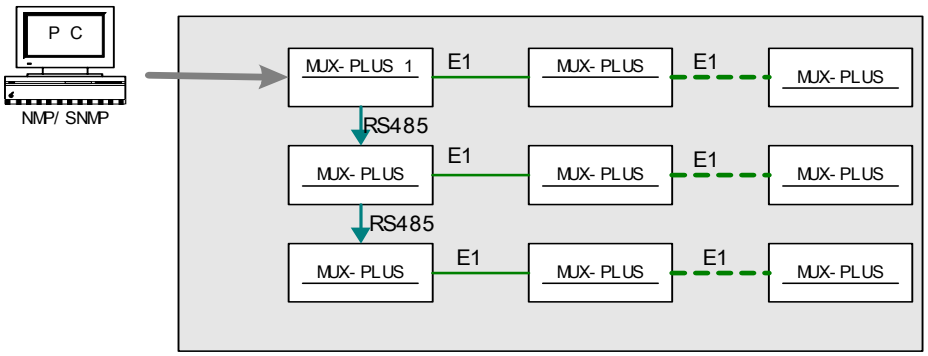
MUX-PLUS connects to the NMP system by only one port.
Local device: the NM Ctrl port (DB9) on front panel of CPU module.
Non-local device: the port can be E1A1 (in-band) or RS-485.
Every MUX-PLUS address is generated by NMP system according to the parent device and the port connected to NMP. The user can modify the MUX-PLUS device address according to the Address Protocol. However, we suggest that you let the system auto-generating addresses, which is safer, and do not modify the addresses at random, unless the device cannot connect with NMP system correctly.
MUX-PLUS device supports Tree mode and Linear mode in the network topology. According to Address Protocol:
In Linear mode, device address should be different only in last part (there are 4 parts in an address), and the address of device farthest from NMP should be higher than that of device nearest NMP.
In Tree mode, the last part of address of up device should be smaller than that of lower or child device.

C-3.4 Connection of MUX-PLUS in NMP topology structure

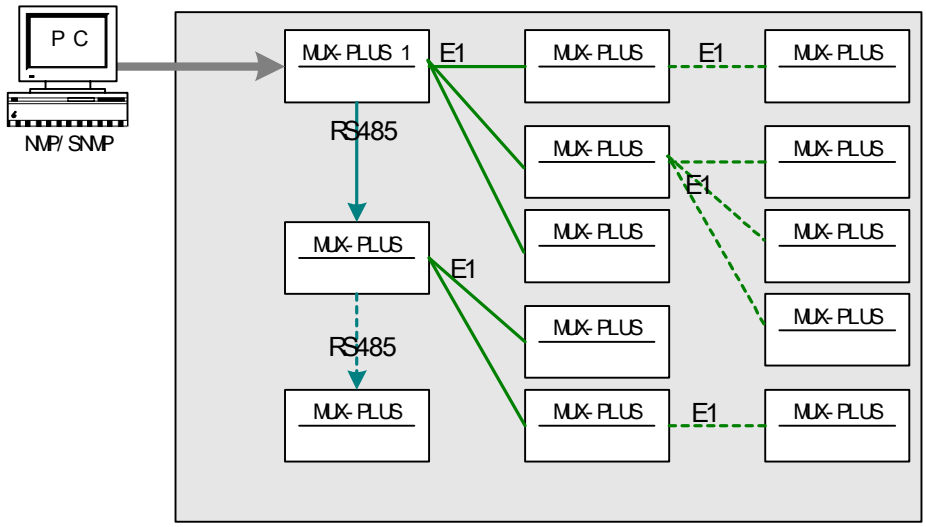
1. Point to point connection of MUX-PLUS in NMP topology structure, with E1 line or multiple chassis RS-485 port.



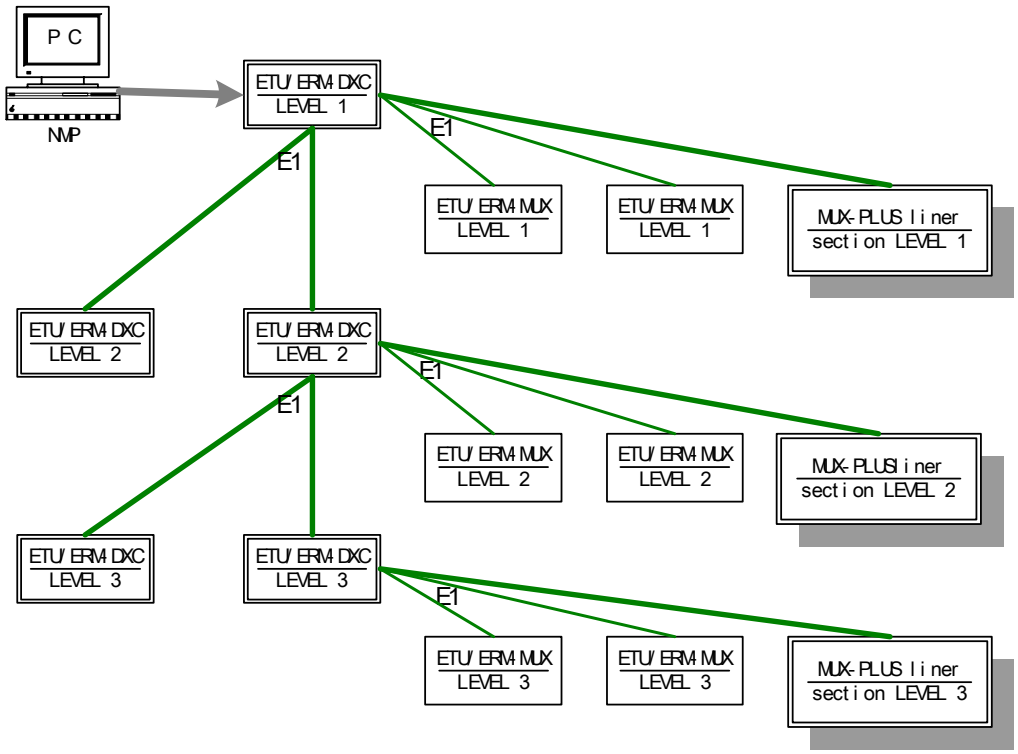
2. Liner mode connection of MUX-PLUS in NMP topology structure, with E1 line or multiple chassis RS-485 port, Supports up to 48 nodes. The address for each device must be different.



3. Tree mode connection of MUX-PLUS in NMP topology structure, with E1 line or multiple chassis RS-485 port. Supports up to 48 nodes. The address for each device must be different.



C-4 Liner mode connection of MUX-PLUS combined with Tree mode NMP topology structure



Supports up to 48 nodes. The address of each device must be different.

Appendix D Basic Configuration

ERM-MUX-PLUS AC standard configurations list

Sequence No.	Item	Component name	Quantity	Attached cable	Number of cables
1	Host	EMP-rack	1		
		EMP-MB (motherboard)	1	Power cord	1
		EMP-AC power module	1 or 2		
		EMP-ACV voice power module	1 or 2		
		EMP-1xE1, single E1 line module	1 or 2	BNC cable	2 cables for one E1 line
		EMP-2xE1, double E1 line module	1 or 2	BNC cable	2 cables for one E1 line
		EMP-CPU control module	1 or 2	DB9 (male) /DB9 (female) direct-connected cable	1
		EMP-C/B control sub-card	1		
	Optional module	Expansion chassis		DB62(male)/ DB62(male)cable	1
		Exp-C/B control sub-card	1		
		multiple chassis	according to user	RJ45 cable	according to user
		G703-EXTCLK		BNC cable	1
2		EMP-N64K/V.35 module		HP68 (male)/4XV35 (female)cable	Cables can be provided according to user requirements
3		EMP-A/SYNC-128K module		DB62 (male) /6XDB25 (female) cable	
4		EMP-G703-64K module		6XRJ45 cable	
5		EMP-MAGNETO module		6X RJ45/RJ11 cable	
6		EMP-FSO voice module		6X RJ45/RJ11 cable	
7		EMP-FXS voice module		6X RJ45/RJ11 cable	
8		EMP-E&M voice module		6X RJ45 cable	
9		EMP-ET100 LAN module		2X RJ45 cable	
10		EMP-X50 module		DB62(male)/5XDB25(female)cable	
11		EMP-SUBE1 module		BNC cable	

Appendix E Firmware upgrade

The setting of TCP/IP after CPU firmware upgrade

After upgrading the firmware of the CPU, the CPU version will not be shown until the next log in. Press "3" will go into the TCP/IP setting. An example shown below and those values will help you to finish the TCP/IP setting. To bypass any parameter entry, press "n" to go to the next setting and press "back space" to delete any characters you may have typed in error. When doing the TCP/IP settings, the MAC address is in hexadecimal format after version V2.01. All other numbers in TCP/IP settings are decimal format. Please keep that in mind when you are doing the TCP/IP setting.

Key-in example:

```
CURRENT MAC ADDR:.7B.0A.78.7B.16.D5
INPUT NEW MAC ADDR:7Dn
INPUT ERR,INPUT AGAIN!
INPUT NEW MAC ADDR:7D.0A.24.3D.42.D2
CURRENT MAC ADDR:.7d.0a.24.3d.42.d2
CURRENT IP ADDR:.192.168.010.110
INPUT NEW IP ADDR:n
CURRENT SUBNET MASK:.255.255.255.000
INPUT NEW SUBNET MASK:n
CURRENT GATEWAY IP:.202.100.064.068
INPUT NEW GATEWAY IP:n
CURRENT TFTP SERVER IP:.202.102.010.010
INPUT NEW TFTP SERVER IP:n
CURRENT TFTP PATH:
INPUT NEW TFTP PATH:N
CURRENT COMMUNITY RD/WR:00000000
INPUT NEW COMMUNITY RD/WR:N
CURRENT COMMUNITY RD ONLY:00000000
INPUT NEW COMMUNITY RD ONLY:Public
CURRENT COMMUNITY RD ONLY:Public
CURRENT ACCESS IP ADDR #1:.000.000.000.000
INPUT NEW ACCESS IP ADDR #1:192.168.10.4
CURRENT ACCESS IP ADDR #1:.192.168.010.004
CURRENT ACCESS IP ADDR #2:.000.000.000.000
INPUT NEW ACCESS IP ADDR #2:192.168.10.5
CURRENT ACCESS IP ADDR #2:.192.168.010.005
CURRENT ACCESS IP ADDR #3:.000.000.000.000
INPUT NEW ACCESS IP ADDR #3:192.168.10.6
CURRENT ACCESS IP ADDR #3:.192.168.010.006
CURRENT ACCESS IP ADDR #4:.000.000.000.000
INPUT NEW ACCESS IP ADDR #4:198.168.10.7
CURRENT ACCESS IP ADDR #4:.198.168.010.007
CURRENT TELNET MANAGER:0000
INPUT NEW TELNET MANAGER:Admin
INPUT TOO LONG,INPUT AGAIN!
INPUT NEW TELNET MANAGER:User
CURRENT TELNET MANAGER:User
CURRENT TELNET PASSWORD:0000
INPUT NEW TELNET PASSWORD:user
CURRENT TELNET PASSWORD:user
```

Press the "Enter" or "ESC" key to skip all setting and go back to previous page of "NMP/SNMP"

Appendix F Version II NMP/SNMP functions

F-1 Additional functions for Version II NMP/SNMP

(The additional functions below only show the difference in Version II, otherwise everything else is the same as with Version I module)
In the system menu, press "6" button to go into the menu.

<< SYSTEM MENU >>	
1. VERSION	To show the version info.
2. CLOCK	To modify system clock.
3. NMP MODE	To modify the management parameters of NMP/SNMP
4. E1 BACKUP	To modify the backup mode of E1 module
5. CHANGE PASSWORD	To change password
6. SETUP TIME	To setup the system time
7. SETUP EXTEND BOX	To setup expansion chassis
0. EXIT	Press 0 to exit
INPUT SELECT:1	

All the following menus in this appendix deal with the management of expansion chassis. The "Up" refers to the parent equipment where management is passed from and the "Down" refers to child equipment that has management passed to it.

F-2. NMP / SNMP management parameters
From the main menu press "3", to enter the NMP/SNMP setting menu:
NMP MODE:MAJOR
UP:NMP
OWN:E1A1:NULL E1A2:NULL E1B1:NULL E1B2:NULL

<< SYSTEM CONFIG-NMP MODE >>	Descriptions
***1. MAJOR JOINT**	Major Joint
2. SUB JOINT	Sub Joint
3. DISABLE NMP	Disable NMP management function
4. IP ADDRESS	Modify the TCP/IP setting of SNMP agent
5. DEVICE ADDRESS	Modify the hardware address setting
0. EXIT	Press 0 to exit
INPUT SELECT:1	

Select 1 through 5 to go into the setting, or press 0, Enter or ESC key to get back the upper pages

F-3. The system configuration of NMP mode
In NMP/SNMP menu, press 1 to modify the system config-nmp mode-major.

<<SYSTEM CONFIG-NMP MODE-MAJOR >>	
***1. UP**	Network management channel (Up channel)
2. DOWN	Network management channel (Down channel)
0. EXIT	Press 0 to exit
INPUT SELECT:1	

Press 1 or 2 to go into the sub-menu
Or press 0, Enter or ESC to go back to the upper menu

F-3-1 System config-nmp mode-major-up setting

In "SYSTEM CONFIG-NMP MODE-MAJOR" menu, press 1 for "up channel sub-menu"

```
<< SYSTEM CONFIG-NMP MODE-MAJOR-UP >>
*1. LOCAL NMP                    Local NMP setting
 2. SNMP                         The SNMP setting
 0. EXIT                         Press 0 to exit
INPUT SELECT:1
```

Press 1 for local NMP setting, press 2 for SNMP setting; Or press 0, Enter or ESC to go to upper menu

F-3-2 SYSTEM CONFIG-NMP MODE-MAJOR-DOWND setting

In "SYSTEM CONFIG-NMP MODE-MAJOR" menu press 2 for "SYSTEM CONFIG-NMP MODE-MAJOR-DOWND"

```
<< SYSTEM CONFIG-NMP MODE-MAJOR-DOWND >>
*1. DOWN1 E1A1                   E1A1 Down
 2. DOWN2 E1A2                   E1A2 Down
 3. DOWN3 E1B1                   E1B1 Down
 4. DOWN4 E1B2                   E1B2 Down
 0. EXIT                         Press 0 to exit
INPUT SELECT:1
```

Press 1 to 4 to go into the submenu, the following example is shown when pressing 2:

```
FREE TIMESLOT IS:
E1A2: 1-15,17-31,
CURRENT:E1A2-NULL
INPUT TIMESLOT(INPUT 0 TO CANCLE):31;
```

Press 0, Enter or ESC to go to the upper menu

F-4 "SYSTEM CONFIG-NMP MODE-MAJOR" setting

In NMP/SNMP menu, press 2 to modify the "SYSTEM CONFIG-NMP MODE-MAJOR"

```
<<SYSTEM CONFIG-NMP MODE-MAJOR >>
*1. UP                           Network management up channel
 2. DOWN                         Network management down channel
 0. EXIT                         Press 0 to exit
INPUT SELECT:1
```

Press 1 to 2 to go into the submenu, press 0, Enter or ESC to go upper menu

F-4-1 "SYSTEM CONFIG-NMP MODE-SUB-UP" setting

In "SYSTEM CONFIG-NMP MODE-SUB" menu press 1 for "SYSTEM CONFIG-NMP MODE-SUB-UP", parameters below:

```
<< SYSTEM CONFIG-NMP MODE-SUB-UP >>
1. UP E1A1                          E1A1 Up
2. UP E1A2                          E1A2 Up
3. UP E1B1                          E1B1 Up
4. UP E1B2                          E1B2 Up
5. UP 485                           RS-485 Up
0. EXIT                             Press 0 to exit
INPUT SELECT:1
```

Press 1 to 4 to go into the submenu, when press 2 shown below:

```
FREE TIMESLOT IS:
E1A2: 1-15,17-31,
CURRENT:E1A2-NULL
INPUT TIMESLOT(INPUT 0 TO CANCEL):31;
```

Press 0, Enter or ESC to go upper menu

F-4-2 "SYSTEM CONFIG-NMP MODE-SUB-DOWN" setting

In "SYSTEM CONFIG-NMP MODE-SUB " menu press 2 for "SYSTEM CONFIG-NMP MODE-MAJOR-DOWND" setting

```
<< SYSTEM CONFIG-NMP MODE-MAJOR-DOWND >>
*1. DOWN1 E1A1                      E1A1Down
 2. DOWN2 E1A2                      E1A2Down
 3. DOWN3 E1B1                      E1B1Down
 4. DOWN4 E1B2                      E1B2Down
 0. EXIT                            Press 0 to exit
INPUT SELECT:1
```

Press 1 to 4 to go into the submenu, when press 2 shown below:

```
FREE TIMESLOT IS:
E1A2: 1-15,17-31,
CURRENT:E1A2-NULL
INPUT TIMESLOT(INPUT 0 TO CANCLE):31;
```

Press 0, Enter or ESC to go to the upper menu

F-5 ADD / DELETE expansion rack

In normal situation, the CPU will not detect if there is an extension rack or not. When adding a new ERM-MUX-plus rack as an expansion rack, you need to do the proper setting to add an expansion rack.

In system menu, press 3 to show if there were an extension rack there. To add / delete extension rack:

```
CURRENT EXTEND BOX STATE:NO
ADD(A) OR DELETE(D) EXTERN BOX
PLEASE INPUT:
```

F-6 A new status display for IO card

6.1 There are new added statuses LEDs for N64/V35 and A/SYNC-128 cards in each direction. Those LEDs are MARK, SPACE and ALT.

Example:

```
SLOT 01 A/SYNC-128K LINE 1 MARK (TD)
SLOT 01 A/SYNC-128K LINE 1 MARK (RD)
SLOT 01 A/SYNC-128K LINE 5 ALT (TD)
SLOT 01 A/SYNC-128K LINE 5 ALT (RD)
SLOT 01 A/SYNC-128K LINE 3 ALT (TD)
SLOT 01 A/SYNC-128K LINE 3 ALT (RD)
SLOT 02 N64/V35 LINE 1 ALT (RD)
SLOT 02 N64/V35 LINE 1 MARK (RD)
SLOT 02 N64/V35 LINE 4 ALT (RD)
SLOT 02 N64/V35 LINE 4 MARK (RD)
```

There are new added statuses LEDs for FXS/FXO card. Those LEDs are Normal, Active and alarm.

Example:

```
SLOT 05 FXS NORMAL
SLOT 05 FXS LINE  1  NORMAL
SLOT 05 FXS LINE  2  NORMAL
SLOT 05 FXS LINE  3  NORMAL
SLOT 05 FXS LINE  4  NORMAL
SLOT 05 FXS LINE  5  NORMAL
SLOT 05 FXS LINE  6  NORMAL
SLOT 07 FXO NORMAL
SLOT 07 FXO LINE  1  NORMAL
SLOT 07 FXO LINE  2  NORMAL
SLOT 07 FXO LINE  3  NORMAL
SLOT 07 FXO LINE  4  NORMAL
SLOT 07 FXO LINE  5  NORMAL
SLOT 07 FXO LINE  6  NORMAL
```

Appendix G New released functions for E1 module

The new release Error and Performance function for E1 module

G-1 The functions of BERT

```
<< MAIN MENU >>
1. E1  CONFIG              The configuration of E1 module
2. I/O CONFIG              Retrieve and modify I/0 card setting
3. DISPLAY CONFIG          Display the configuration
4. CONFIG                  Save and configure the system parameters
5. SET DEFAULT             Restore all the parameters back to factory default
6. SET SYSTEM              Retrieve and modify the system setting
7. BERT                    Bit-error-rate test function
0. EXIT                    exit
INPUT SELECT:
```

Select 1 through 7 to go into the relative function
Select 7 to go into BERT test function
Press 0 or ESC key to go back to the upper page

G-2 BERT functions

```
<< BERT TEST >>
 1. FUNCTION               Start / Stop BERT test
 2. CHANNEL                Modify the E1 channel which will be tested
 3. PATTERN                Setup the test pattern
 4. ERROR INSERT           Insert error codes into the E1 trunk
 5. RESULT                 Test result
 0. EXIT                   Back to the main menu
INPUT SELECT:1
```

Press 0 or ESC, to go back to the main menu
Press 1 through 5 to enter the sub-menu

G-3 Start / Stop BERT testing

```
<< FUNCTION >>             Description
1. STOP                    To stop the BERT testing
2. START/RESTART           To start or restart the BERT testing
0. EXIT                    Back to the upper menu
INPUT SELECT:
```

Press 0 or ESC, to go back to the upper menu
Press 1 or 2 to select the test function
Note: The E1 performance monitoring is always on and can not be turned off.

G-4 Channel selection

When select the E1 channel which will be tested, please refer to your actual configuration.
Only one E1 module shown below:

```
<< CHANNEL >>
1. E1A1                 Select the first E1 channel of the first E1 module
2. E1A2                 Select the second E1 channel of the first E1 module
0. EXIT                 Back to the upper page
INPUT SELECT:1
```

Press 0 or ESC, to go back to the upper menu
Press 1 or 2 to select the E1 channel will be tested
Note: The E1 performance monitoring is always on, can not be off.

Two E1 modules with single channel shown below:

```
<< CHANNEL >>
1. E1A1                 Select the first E1 module
2. E1B1                 Select the second E1 module
0. EXIT                 Back to the upper page
INPUT SELECT:1
```

Press 0 or ESC, to go back to the upper menu
Press 1 or 2 to select the E1 channel will be tested

Two E1 modules and two channels shown below:

```
<< CHANNEL >>
1. E1A1                 Select the first E1 channel of the first E1 module
2. E1A2                 Select the second E1 channel of the first E1 module
3. E1B1                 Select the first E1 channel of the second E1 module
4. E1B2                 Select the second E1 channel of the second E1 module
0. EXIT                 Back to the upper page
INPUT SELECT:1
```

Press 0 or ESC, to go back to the upper menu
Press 1 through 4 to select the E1 channel will be tested

G-5 Test pattern selection

Choose the appropriate test pattern

```
<< PATTERN >>
1. 2^9-1                The 2^9-1 test pattern
2. 2^11-1               The 2^11-1 test pattern
3. 2^15-1               The 2^15-1 test pattern
4. QRSS                 The QRSS test pattern
5. ALL 0                The ALL 0 test pattern
6. ALL 1                The ALL 1 test pattern
7. ALT                  The ALT test pattern
8. 3 IN 24              The 3 IN 24 test pattern
9. 1 IN 16              The 1 IN 16 test pattern
A. 1 IN 8               The 1 IN 8 test pattern
B. 1 IN 4               The 1 IN 4 test pattern
0. EXIT                 Back to upper page
INPUT SELECT: 1
```

Press 0 or ESC, to go back to the upper menu
Press 1 through B to select the test pattern will be sent

G-6 Bit error rate insertion

```
    << ERROR INSERT >>
     1. NONE                    None of error inserts
     2. SINGLE                  Insert just one error
     3. 1E-1                    Insert 1E-1 errors into the E1 link
     4. 1E-2                    Insert 1E-2 errors into the E1 link
     5. 1E-3                    Insert 1E-3 errors into the E1 link
     6. 1E-4                    Insert 1E-4 errors into the E1 link
     7. 1E-5                    Insert 1E-5 errors into the E1 link
     8. 1E-6                    Insert 1E-6 errors into the E1 link
     9. 1E-7                    Insert 1E-7 errors into the E1 link
     0. EXIT                    Back to upper page
    INPUT SELECT:
```

Press 0 or ESC, to go back to the upper menu
Press 1 through 9 to select the bit-error-rate will be sent

G-7 Display performance and test result of the E1 link

```
    E1A1 PERFORMANCE
           Bipolar violations count(BPV):    0
               Current CRC-4 error count:    0
             Current errored seconds(ES):    0
       Current unavailable seconds(UAS):    0
                   Current Seconds(SEC):    0
         Long-term errored seconds(LES):    0
    Long-term unavailable seconds(LUAS):    0
                Long-term seconds(LSEC):    0
        OLD Current errored seconds(ES):    0
    OLD Current unavailable seconds(UAS):    0
                              BIT ERROR:    0
                         BIT ERROR RATE:    0
      <ESC>  <CR> CLEAR. <SPACE> REFRESH.
```

Press ESC to back to upper page
Press <CR> to clear the result

E1 Transmission Series

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